The Builder.

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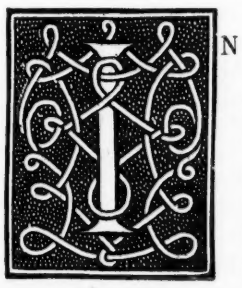
The Buildings of Elementary Schools.



IN a recent issue, we briefly referred in a Note to the circular of the Anglesea County Council to the managers of non-provided elementary schools in regard to structural repairs and alterations.* The subject has already become more important, and it is desirable to refer to it at greater length than was possible within the compass of a Note.

Two facts should be referred to. The first is the action of the Education Committee of the London County Council and of the Council itself in this matter. Under the London Education Act 1903 the County Council is placed—as regards London—in much the same position as a country county council towards its district. By section 7 (*d*) of the Education Act 1902 the local authority, that is, the county or town council, shall in the case of what were called "voluntary" as opposed to Board schools, and are now called "non-provided" schools, require the managers "to make such alterations and improvements in the buildings as may be reasonably required." If a dispute on this point arises, then the difference between the local authority and the managers is to be decided by the Board of Education in London. As an example of the increasing importance of this enactment, it may be mentioned that a meeting was held last week at Durham to raise a sum of 25,000*l.*, part of a sum of 35,000*l.* which is required in order to put the non-provided or Church schools in the state demanded by the County Council of Durham. Still more important is the fact that the Education Committee of the London County Council has reported that twenty-nine non-provided schools are structurally deficient. The number of the non-provided schools in London is 508, and the Council has referred back the report in regard to the twenty-nine schools till the report as to the whole number is complete. The survey which was ordered by the Council was to be as to (1) lighting, (2) ventilation, (3) heating, (4) cloak accommodation, (5) lavatory accommodation, (6) teachers' rooms, (7) staircase accommodation and emergency exits, and (8) areas of playground.

It is unquestionable that reports in all these particulars should be made by skilled persons on behalf of every local authority. It is equally certain that the ratepayers will insist sooner or later on this being done. There is yet another point. We have in these columns over and over again insisted that the system of reports to the Education Department on the structure and sanitation of elementary schools by an inspector, whose main business is to examine the scholars, was useless and absurd. The report of the architect of the London County Council and that of the technical adviser of the Durham County Council, upon which—as we have already said—a demand for a large expenditure is based, clearly show that the Board of Education has been lax in its duty. The duty of that department was, among other things, to take care that the buildings of elementary schools, kept up in a large measure by Government grants, were reasonably perfect. No one would require that school buildings should be elaborately equipped and magnificently built, but they should reach a good and proper structural and sanitary standard. The Education Department has already sanctioned the demands of the Durham County Council, thereby showing that that body only requires reasonable alterations and improvements, such as unquestionably should have been completed long before the Act of 1902 was passed.

It is certain that the health of the community will be largely increased by the sanitary improvement of elementary schools, so that from a non-educational point of view the present trend of affairs is welcome. But an improvement in the buildings of elementary schools may, we hope, tend to greater educational efficiency, and it should lead to an improvement in the buildings of secondary schools. One of the points for report by the architect of the London County Council was in regard to lighting. It would be interesting to see the result of a survey by this official of many of our private and public schools, for we feel pretty sure they would come in for a good deal of censure. It will be an absurd anomaly if the buildings of our elementary schools are brought up to a reasonable standard of efficiency whilst those of so-called higher schools are left in a less satisfactory state:

* See our issue for November 12.

But it will be no loss to the community if some of the private schools in which the children of the lower middle class are now educated come to an end in consequence not only of the provision of a reasonably perfect system of education in elementary schools, but of the provision of reasonably perfect elementary school buildings.

On the immediate question as to the policy of the London County Council in postponing action as to the twenty-nine schools until the report on the whole number is completed, so that the ratepayers of London may be impressed with the shortcomings of the managers of Church schools and appreciate the expenditure which will be required in order to find places for children for which the schools are now pronounced inadequate, it is only necessary to speak briefly. From a business and from an educational point of view, the moment a school building is reported unfit, then the improvements and alterations should be commenced as soon as possible. Every day's delay is the continuance of a state of things condemned by competent persons, and no excuse such as that put forward by the Council is of any value from an impartial point of view. Immense sums of money, it is clear, will have to be spent on school buildings all over England, and the sooner the work is put in hand the better.

THE CARE OF ANCIENT MONUMENTS.

BY PROFESSOR BALDWIN BROWN.

I.

THE ancient monument is at present the centre of a considerable amount of activity, of which it is itself so sublimely unconscious. One wonders what the Great Pyramid or the trilithons of Stonehenge have thought of the various people who for different ends have been busy about them through the ages! They have been adored and then shamefully used, have been ransacked for treasure and exploited as quarries; have been measured and theorised over, and now again find themselves the objects of a new sort of cult not exactly religious, but of a pious and at times sentimental order. In our own land ancient monuments for the most part take care of themselves, or depend on the irregular assistance proffered from time to time by their private friends. Only in the case of a very few in Great Britain is the protection of the Ancient Monument Acts of 1882 and 1900 available, though in Ireland, as is usual with that much-persecuted country, the national monuments are far better treated. On the Continent every country, practically speaking, is supplied with official machinery for the protection of its monuments. These are made everywhere the object of the attentive scrutiny of inspectors and the deliberations of State-appointed Commissions, while in several countries there are formal Monument Acts, the number of which has been considerably augmented within the last few years.

It is the purpose of what follows to give in the briefest possible form an indication of what has recently been essayed in monument administration both in our own and in foreign countries.

Monument administration, in the sense in which it is understood in Germany, Italy, or France is a somewhat extensive and complicated affair. The word monument means, of course, far more than is commonly understood by the term when applied, say, to the Nelson monument in Trafalgar-square or the Wellington monument in St. Paul's. It covers, roughly speaking, all old structures, and all the objects which we gather into museums like those at Bloomsbury or South Kensington. Quite recently the term has been somewhat arbitrarily extended to embrace natural scenes and objects, the preservation of which is of importance in the interest of the community. The draft of a Monument Law for the Grand Duchy of Baden in 1883 explains the term as including "all immovable and movable objects which have been handed down from a bygone period of civilisation, and as characteristic productions of their time have a special significance for the comprehension of art and art industry and their development, for the knowledge of antiquity and for historical investigation in general, as well as for keeping alive the remembrance of events of outstanding interest," while the Monument Law of the Grand Duchy of Hesse, which was passed in 1902, includes under the expression "Natural Monuments" "phenomena of the earth's surface, such as watercourses, rocks, trees, and the like, the maintenance of which is a matter of public interest on grounds of history or of natural history, or from considerations of the beauty or special character of a landscape."

All these objects, natural and artistic, through their interest, their beauty, or their associations, possess a value for the present to which testimony is given by the efforts made in so many quarters for their preservation. There is no space here to attempt to appraise this value or to discuss the reasons which make for protection. As a matter of general theory almost everyone will admit this value. Most people like the country, and are open to the impressions of beauty and sublimity from natural scenery, while few will deny that they are interested in a historic memorial or are sensible to the charm of a picturesque mediæval building. Unfortunately this vague general feeling is seldom effective for the defence of an ancient monument or a lovely site when attacked in the name of some modern improvement. It requires continual effort on the part of those fully alive to the value of this portion of the national assets to secure a proper balancing of the claims of the new with those of the old. If the importance of the preservation of the remaining specimens of our older town architecture were once firmly implanted in the public mind it would be found possible in very many cases to devise a way of meeting modern requirements, while yet preserving what is old. The two well-known churches in the Strand were repeatedly warned off that thoroughfare on the ground that they were hopelessly in the way, but the friends of monuments managed to save them from the spoiler, and we now behold them not only not in the way but the *foci* of a great architectural scheme, and elements of the utmost value for the future effect of the whole neighbourhood.

The means that are taken to impress the value of ancient monuments on the general sense of the community are threefold. There is first the agency of private societies which stimulate and guide public opinion, and of individuals who write to the papers, interview local authorities, and ask questions in the House in defence of some threatened possession. There are next official agencies in the form of State-appointed Commissions served by a staff of inspectors and custodians, who bring Government influence to bear on monument problems, though they may not be armed with direct legal authority; and, lastly, there is definite legislation, either in the form of State Monument Acts or in that of local by-laws affecting building in special towns or districts. Among ourselves private societies flourish, and by their influence on public opinion are the most potent agencies we possess for effecting the end in view. On the other hand, our Monument Act or Acts are very slight and ineffective, while we are absolutely without the elaborate official organisation of Monument Commissions in which continental countries are so rich. Abroad all three agencies are in active operation, and their organisation and manner of working will now be briefly sketched.

The following European countries possess formal Monument Acts, that are here arranged in order of date: Greece, 1834; Hungary, 1881; Great Britain and Ireland, 1882; Turkey, 1884; France, 1887; Bulgaria, 1884; Roumania, 1892; Canton de Vaud, 1898; Italy, the Grand Duchy of Hesse, Cantons of Bern and Neuchâtel, 1902. To this it should be added that other countries also, and these some of the most important in Europe, have State Monument Acts at this moment under discussion. This is the case in Prussia, in the Austrian Empire, in Bavaria, and also in Spain, while the Grand Duchy of Baden in 1883 and Greece in 1893 had drafts of new or amending Acts before their Parliaments.

This list of Monument Acts does not exhaust the efforts of Legislatures and Governments for the care of monuments, for there exists in almost all European countries a mass of Royal and Ministerial decrees and circulars, and of resolutions of deliberative bodies which have the practical effects of law, and the majority of which establish official Commissions and Conservators for the care of monuments throughout the regions where the rescripts run. In fact, it conveys a false impression when it is said that one country possesses and another is without a Monument Law, with the implication that monuments are safer in the one country than in the other. Prussia has no Monument Act, though she has been talking of one for the past eighty years, yet there exists in the Prussian provinces a very full provision for the survey and upkeep of monuments, and there are no fewer than fourteen provincial and district Conservators in charge of the work, with a General Conservator, under the Minister of Religion, Education, etc., at their head.

The Austrian Empire, again, has no monument legislation, but for the last fifty years the "Royal and Imperial

Central Commission for the Investigation and Maintenance of Artistic and Historical Monuments" has been at work. France had her "Commission des Monuments Historiques" for half a century previous to her Monument Act of 1887, and at this day Italy probably does more for the upkeep of her monuments through her provincial commissions, the "Uffici Regionali per la Conservazione dei Monumenti," than through the direct agency of her State Monument Act of 1902. Spain, Belgium, Holland, and Switzerland have their officially-appointed Monument Commissions, though they are without formal laws; Denmark and the other northern kingdoms attach the care of monuments to the administration of their great museums of the national antiquities.

The best sign of a healthy public feeling on this question in foreign countries is the existence of a large number of active private societies vowed to a holy war in the defence of the monumental legacy of the past against modern vandalism. These private societies have always flourished greatly in our own country, and we have, indeed, set the fashion in them to our neighbours over the sea. The Society for the Protection of Ancient Buildings, for example, which has about it for the foreigner the glamour of the name of William Morris, has a reputation abroad which it hardly enjoys in certain architectural circles at home. This last fact, it needs hardly to be said, is not wholly to its discredit. The example we have set is now being followed abroad by the foundation of new protective societies, on which a word will be said later on. Over and above these more or less polemical associations there are, of course, both at home and abroad, the established antiquarian and architectural societies, the members of which may be trusted to make their influence felt in favour of monument preservation. France is particularly rich in local societies of the kind, some of the most important of which owe their inception to the energy of Arcisse de Caumont. Germany has a general association of local antiquarian societies, and these constituent bodies number no fewer than 161.

It is sometimes imagined that in matters like the care of our monumental legacy from the past the foreigner places his trust in official machinery, while in our own country we depend rather upon the free action of public opinion. This may have been the case to some extent in the past, though de Caumont, who in the thirties did so much to create the modern intelligent interest in mediæval art, was not in the official ring; but in the present day, in all the more progressive European countries, there is great personal activity shown in the founding of societies with a national or a local scope, and in outspoken criticism of official "restorers" and of bureaucratic methods of monument administration in general. Special organs of this movement exist in the foreign Press. Thus in 1887, the year of the passing of the French Monument Act, M. Charles Normand, an indefatigable champion of monuments, founded a "Comité des Monuments Français" with its organ, the periodical entitled *L'Ami des Monuments*, which announces itself as "founded with the aim of watching over the monuments of art of France and the general appearance of her towns, and of defending the picturesque and the beautiful." A German periodical founded more recently in the same interests is of greater general value as giving a wider outlook on the whole field of monument administration in every civilised land. The periodical in question is called *Die Denkmalpflege*—"The Care of Monuments," and was started in 1899*, as the organ of a movement for the defence of the older monuments of the Fatherland which sprang up about that time. A league called 'Heimatschütz"—"The Defence of Home," recently founded, carries out the propaganda to which the periodical gives literary expression. In Belgium a national society of somewhat similar aim was established in 1894 under the name "L'Œuvre Nationale Belge," or "L'Œuvre Nationale de l'Art Appliqué à la Rue," the main object of which was to improve the artistic character of new work, both in buildings, and in details such as electric light standards, shop signs, or the like; but its influence extends also to the preservation of excellent work handed down from the past. There is also a "Société Nationale pour la Protection des Sites et des Monuments en Belgique," which breaks a lance sometimes with the official "Commission Royale des Monuments."

These societies of national aims correspond to our own useful "National Trust for Places of Historic Interest and Natural Beauty." Their activities are supplemented by provincial and urban societies of narrower scope but of effective energy. Vienna has her "Association for the Protection and Maintenance of the Artistic Monuments of Vienna and Lower Austria." In France in 1897 there was formed in the Prefecture of the Seine a "Commission du Vieux-Paris," the object of which is "to search out the vestiges of the older city, to record their present condition, and, as far as practicable, to supervise their maintenance." A "Commission Municipale du Vieux-Lyon" was formed in 1898 on the lines of that of Paris, and in 1903 there was published at Lyons an illustrated *Inventaire Général du Vieux-Lyon*, which contains a list of existing houses possessing a value from the point of view of Lyonnaise history and art.† There is also at Rouen a "Société des Amis des Monuments Rouennais." In Belgium an energetic local "Société pour la Protection des Sites et des Monuments de la Province de Namur" has lately sprung into existence, and will probably lead to the foundation of other associations of the same kind. In Italy there is the same awakening of personal interest in the protection of the national heirlooms, which is the best and healthiest form which the movement for the care of monuments can take. In various towns of the Peninsula societies are formed by "Amici dei Monumenti," the object of which is to watch carefully the official proceedings of the Government authorities who deal with monuments, and to keep the public interested in the subject through the medium of the Press. The "Riunione Artistica," of Perugia, recently formed a special committee of its members for this purpose. In Rome the "Associazione Artistica fra i Cultori di Architettura," now presided over by Signor M. E. Cannizzaro, has been doing good work in a city that needs intelligent treatment more than perhaps any other.

It is in Germany, however, that the personal movement for the care of monuments, as distinct from State and official agencies, is most apparent. Up till a few years ago Germany was in this respect somewhat in the background. There was plenty of official machinery for the protection of monuments, but the public in general had not taken up the subject. It has been the custom in Germany for a General Congress of Historical and Artistic Societies to be held yearly. The Congress of 1899, which met at Strassburg, took up the monument question, and passed certain resolutions, signed by representatives of 124 societies, in which the interest already shown by governments in these memorials of the past greatness of the people was acknowledged, but a demand was made for increased attention to what was termed "a question of life and death for the historical sciences and for the maintenance of the national consciousness." From that date a yearly congress, exclusively for the discussion of monument questions, has been held in different parts of Germany, and the various aspects of these questions have received the systematic treatment for which our neighbours across the North Sea are famous. The Ministers of the German States have sent delegates to these congresses, and some of the leading architects and antiquaries of the country have taken part in the proceedings. The verbatim reports of these, which have been published under Government subsidies, make the most interesting body of reading available on monument administration generally.

No principle is more insisted on in these discussions than the need for basing the movement for the care of monuments on the public will. Laws and commissions, it is pointed out, can only be really effective if they represent the genuine wishes of the community. The idea is to work from below upwards, and to build up a solid conviction of the real value of this part of the national assets by influences brought to bear on the public in general and especially on the young. This view has been well expressed by a Prussian jurist, Dr. Bredt, in a small brochure that is one of the best things written on the care of monuments in our own time.* He warns his readers against reliance on laws and regulations, and especially on the weapon of compulsory purchase or expropriation, which can, however, be held in reserve against the obdurate proprietor who insists on maltreating a monument of public value that happens to be on private land. The true method of monument protection, he points out, is the instruction of the public: Popular articles in the daily journals, free public lectures, lessons to the children in the schools, and visits with them to

* As an offshoot from the *Centralblatt der Bauverwaltung*. It is published by Ernst und Sohn, Berlin, and only costs M.8 per annum.

† It is worth notice, as an encouraging sign of the times in our own country, that a proposal is now under consideration by the municipal authorities of Edinburgh for making an inventory of the older domestic buildings of that city, as a preliminary to possible measures of protection.

* *Die Denkmalpflege und ihre Gestaltung in Preussen.* Berlin. 1904.

interesting buildings and to museums, are all means to this end; and a suggestion is made that a small illustrated home-guide should be prepared in every ancient city for distribution in schools. In this way, he argues, will the interest in the preservation of monuments, now confined to a limited circle, pass into the flesh and blood of the rising generation.

NOTES.

Architects' Drawings.

WE are glad to be able to announce that the Council of the Institute of Architects have resolved to devote a sum of not more than 100*l.* from their funds towards upholding the appeal in the case of Gibbon *v.* Pease. But we must press on the Council the consideration that the many architects in this country whose subscriptions form the bulk of the income of the Institute, and whose interests the Institute is supposed to represent, will not be satisfied with the mere pecuniary support of a case in which the interests and the honour of the whole profession are concerned. They will expect that the Institute, through its newly elected body the "Board of Defence," should take an active part in supporting the just claims of the architects, and in representing what is the true function of architectural drawings, which the law has hitherto misunderstood, through not having it clearly and logically stated. What we have to show is that the existing law (as now construed) is an injustice based upon a mistake, and subscribers to the Institute have a right to expect that the Institute should do all in its power to bring this properly before whatever tribunal is ultimately appealed to. If it fails in this, the question will naturally be asked—what is the use of a "Board of Defence" which does not defend?

Technical Education.

ALL who are interested in this important subject will do well to notice the comments made by Sir William White at the recent prize distribution of the Sir John Cass Institute. Although admitting that our friends in the United States and Canada had a good deal to teach us, the speaker expressed the comforting opinion that our best systems of instruction were fully equal to the best in America and on the Continent. This favourable condition, he thought, was less generally evidenced lower down in the scale; but, as a set-off, our system of evening classes was described as being far in advance of anything attempted elsewhere. It is very satisfactory to observe this eulogium of the valuable work done by polytechnics and kindred institutions, which undoubtedly confer inestimable benefits upon the working classes and others who have no time for study during the day.

"Owners" under the London Building Act.

THE case of Orf *v.* Payton (*Times*, December 3) refers to the London Building Act, 1894, and although the actual decision turned upon the question of costs, an important point seems incidentally to have been decided. The plaintiff and defendant at an auction had become lessees from the County Council of two adjoining lots held under building conditions, upon the terms that leases should be granted and that until the granting of the said leases the lessees should be deemed to be tenants at will, and the conditions also gave the lessees power to excavate for the purpose of the building. The plaintiff had erected a party wall on the line of junction between the two plots, having served the defendant with notice under the London Building Act, 1894. The action was brought by the plaintiff claiming that the defendant had trespassed upon the party wall, and was utilising it for his own purposes. During the pendency of the action an arbitration had been held, and the arbitrator had awarded the plaintiff a sum as the defendant's share of erecting the wall, which sum had been paid by the defendant, but on a motion as to who should pay the costs of the proceedings, the rights of the parties had to be considered. It was contended that the plaintiff was an "owner" within the meaning of section 5, sub-section 29 of the London Building Act, 1894, "a person in possession or receipt either of the whole or any part of the rents and profits of any land or tenement or in the occupation of any land or tenement otherwise than as a tenant from year to year or any less term, or as a tenant at will." It was argued that the plaintiff was not a tenant at will, owing to his rights under the conditions which enabled him to take away sand and gravel and commit legal "waste," but the Court dismissed these inferences, and held that the plaintiff had specifically agreed to be a tenant at will, and that therefore he had no rights as "owner" under the London Building Act, and he was condemned in costs. It will be remembered that it has already been decided in the case in *re* Stone *v.* Hastie (see our note "Rights over Party Walls," the *Builder*, October 31, 1903), that the provisions of the London Building Act charging an adjoining owner with a proportion of expenses in respect of extra user of a party wall only apply to the owner of the premises.

Sea Erosion in North Wales.

THE storms which caused so much injury to the Dee embankment, between Holywell and Mostyn, were also responsible for serious damage in the neighbourhood of Rhyl, about ten miles further along the coast. It appears that a portion of the promenade extension has been undermined by the action of the sea, but fortunately this can be made good at a comparatively small cost. A more serious condition is evidenced at the eastern end of the town, and it seems not improbable that a few more storms might render the lower parts of Rhyl liable to inundation. In the direction of Prestatyn—a village about four miles to the east of Rhyl—the sea has encroached for a distance of quite 140 yds. within the last thirty-three years, the rate since 1898 having been between 6 and 7 yds. per annum. Unless effective measures are taken without delay it is morally certain that the town will suffer considerably. However, as elsewhere, the local authorities appear to think the question is too large for individual action, and in the present juncture the only decision made is that the London and North-Western Railway Company shall be invited to join with the Urban District Council in the construction of defensive works. On this particular part of the coast the railway line is in far less danger than the town of Rhyl, and it is scarcely reasonable to expect the company—which was established more for the earning of dividends than as a quasi-state department of public works—to expend capital in protecting the property of the ratepayers. Unless the Urban District Council want to see a portion of the town swamped, or perhaps washed away, they had better face the situation in a self-reliant spirit, and begin protective works before more damage is done.

The Embankment Roadway.

FOR years past the wretched condition of the roadway of the Victoria Embankment has been a reproach to London. Although comparatively little used, the macadam surface has to be re-made every year at great cost to the ratepayers, and very soon regains its normal character as one of the worst roadways in London. Being in a central position, this thoroughfare necessarily attracts more attention than other highways of similar construction in outlying districts. It serves, however, to point the moral that the modern perversion of Macadam's system is quite unsuitable for urban traffic. The essential feature of the true macadam road is that the small angular fragments of stone used become compacted, without other material, into a mass nearly impenetrable by water and wearing evenly throughout. In the present day the size of 1-in. cube stone fragments recommended by Macadam has been increased up to 2¼ in. or more, with the result that a so-called binding material is necessary for filling up the interstices. This "binding" material is really embryonic mud or dust, while the friction of the large stones one against another furnishes the material for further supplies of mud or dust. Moreover, the effect of unnecessarily large stones in some parts of a roadway is to cause bumping, which leads to general disorganisation of the surface. Unless the road authorities of the London County Council are prepared to conform with the essential requirement of Macadam's system, it would be far better to pave the Victoria Embankment with wood or asphalt, and thus to get rid of a standing reflection upon their capacity.

The Pennsylvania Railroad and New York.

AN engineering project in New York of far greater magnitude than the Rapid Transit Subway is now being executed by the Pennsylvania Railroad Company. At present the terminus of this railway, the premier line of the United States, is in New Jersey, and passengers can only reach New York by means of ferry boats crossing the Hudson River. The inconvenience of this method of access has been felt for a long time, and thirty years ago an abortive attempt was made to connect the two shores of New York Harbour by means of a tunnel. In March last the previously abandoned works were completed by the Pennsylvania Railroad Company, and a second tunnel is now in course of construction to provide adequate accommodation for traffic. The method of tunnelling adopted is to force a hydraulic shield through the silt forming the bed of the river, and so great is the power applied that the soft material can be pushed aside without involving

its entrance to, and removal from, the interior of the tube. When the Hudson River tunnels have been finished, the railway company will be in a position to establish a great terminus in the centre of New York City. This station, with an area of 27 acres, will be situated about 50 ft. below the street level, and a part of the site above it will be occupied by the new United States Post Office buildings. A second pair of tunnels will be carried below the East River on the opposite side of Manhattan Island, coming to the surface at Long Island City. By the completion of this undertaking connexion will be afforded between the Pennsylvania and the New York, New Haven, and Hartford Railways, thus making direct communication possible between New England and the West or South, and effecting a most marked improvement in the traffic conditions of New York itself. Moreover, it is suggested that a further result may be the establishment of a harbour for Transatlantic steamers on the Long Island shore, thereby rendering unnecessary the present tedious navigation of the channel past Sandy Hook and up New York Bay. Thus some place near Long Island city may ultimately become to New York what Tilbury is to London.

Magnetic Testing.

AN important paper on magnetic testing was read to the Institution of Electrical Engineers this week by Mr. G. F. C. Searle, lecturer in physics to Cambridge University. This paper will be a great help to all who have to test the magnetic qualities of iron. Many of the difficulties which are met with in practical work have been cleared up. It was well known, for example, that the results of magnetic tests depended to a considerable extent on the previous magnetic history of the iron. So far as we know, however, Mr. Searle is the first to publish detailed tests showing exactly how the magnetic properties of the iron depend on the previous magnetising forces to which it has been subjected. Mr. Albert Campbell, of the National Physical Laboratory, had anticipated some of Mr. Searle's discoveries, and it is very satisfactory to find in an appendix to the paper that their results are in such close agreement. It is only with virgin iron that very anomalous results are obtained. If the iron be magnetised and demagnetised about fifty times, then perfectly consistent results are obtained, and these results are those which are required in practice. The author found that any mechanical operation considerably affected the magnetic qualities of the iron. He also found that strips cut from the same sheet of transformer iron differed considerably amongst themselves. In order to avoid the very considerable labour involved in winding coils of insulated wire on the samples of iron which have to be tested, the author has devised a magnetic testing square which ought to prove of great use to electricians. We were particularly struck by the method of applying corrections for the demagnetising effects produced by the magnetic lines which leak from the samples under test. Such a correction could only have been applied by a physicist who was also in the front rank of mathematicians. The paper is practically non-mathematical, and so can be easily understood by any electrician. The Institution of Electrical Engineers is to be congratulated on its new departure of welcoming papers by non-members, and Mr. Searle's paper will considerably add to the value of this year's *Journal*.

The Leicester Gallery.

AT the Leicester Gallery is a collection of beautiful water-colour drawings by Mr. W. L. Wyllie, under the title "The Highway of many nations," signifying (as may be supposed) the Thames, long a favourite subject with Mr. Wyllie. In such a set of drawings the opportunity is given for combining landscape effect with the learned and satisfactory treatment of shipping in which Mr. Wyllie has no rival except Mr. Somerscales. One or two of the drawings, notably "The Warspite and Arethusa Training ships" (29), are admirable studies of old men-of-war. In most of the drawings, however, the ships are only an addition to a general landscape effect. How well Mr. Wyllie paints water, river or sea, we all know; but in this exhibition we were also attracted by another point of excellence, viz., the great beauty, variety, and truthfulness of the sky treatment in the various drawings, which is quite as worth note as any other quality in the drawings, and has perhaps been rather overlooked on account of the artist's special reputation as a marine painter. Among the works exhibited we may specially mention "Limehouse, a bit of vanishing London" (10), showing the curious tumble-down buildings along the wharf; "Rotherhithe" (15); "Greenhithe—brisk east wind" (32), a capital sea; "A Tide Rip in the Lower Hope" (47); "Barge Race on the Thames" (52); "St. Mary's Marsh" (62), with a group of barges in the foreground; and "Sea Reach" (68). The exhibition includes also two large architectural subjects, "The Houses of Parliament" (belonging to Sir J. Wolfe Barry) and "St. Paul's from Blackfriars Bridge" (40). The columns under the dome are a little too thin in proportion, but in general this is one of the best representations of St. Paul's from a painter that we have seen—well-balanced, in true perspective, and the character and outline of the western towers well preserved. In another room at the same gallery is a collection of XVIIIth century "Humorous Mezzotints," mostly of a very coarse species of humour and of little artistic value, though they are of interest as showing what sort of thing served to amuse English people one hundred and fifty years ago.

"Sketches at Home and Abroad."

UNDER this title Mrs. Mary F. Raphael exhibits at Mr. Maclean's gallery a pleasing collection of small oil-paintings of scenery, chiefly at Montreuil and the adjoining country. In a broad and sketchy style these show a great deal of talent and fine landscape effect. "From the Bastions, Montreuil-sur-mer," with its masses of white cumulus clouds on the horizon, is particularly effective; and there are a number of other small landscape studies from the same district which have much merit. A larger and more finished work, "A Church-yard Idyll," also claims attention.

TRAMWAY RUNNING POWERS.

IN a paper read last week before the Tramways and Light Railways Association Mr. Sellon presented some interesting facts relative to running powers over tramway systems. It should be borne in mind that "running powers" differ from "facilities," in the respect that the former provide for the cars of one authority to run over the lines of another authority, while the latter merely amount to an arrangement for the issue of through tickets with a change from one car to another at the point of junction. The principles regulating running powers are fairly established in connexion with railway legislation, and, although numerous examples can be quoted of tramway running powers in London as well as in various provincial urban districts, there is still a very strong prejudice against facilities which are so obviously to the advantage of the travelling public. As claimed by Mr. Sellon, the elementary principles of English highway law apply to tramway politics in the respect that a tramway is an improvement of the highway on which it is laid, increasing its capacity, cheapening its use, and saving the expenditure of time and strength by the traveller. Consequently, those to whom Parliament entrusts tramway powers hold substantially the same position towards the public as highway authorities, so far as their powers extend, and they are equally obliged to afford all travellers the maximum facilities within their capacity. The public and local advantages of a tramway should not be limited by unreasonable conduct due to sentimental, selfish, or capricious motives. An example of the unreasonable objections frequently entertained is to be found in the petition seriously presented to Parliament in the session of 1904 against the request of the Tyneside Company for running powers over the tramways of the Newcastle Corporation. The chief plea then put forward was, that the proposals in the company's Bill were objectionable, retrograde, and against the public interest by reason, among other things, of their interference with the principles of municipal self-government. Fortunately the Tyneside-Newcastle running powers were obtained, and the result has been a large increase of tramway traffic. To illustrate the disastrous effect of an interrupted service the Edinburgh and Leith tramway systems may be instanced. The break between these occurred at Pilrig when the Edinburgh section of the line was converted to cable traction, and the consequent loss has been estimated at fully 6,000*l.* per annum, equivalent in this case to 4,000*l.* per mile per annum. The foregoing are two instances quoted by Mr. Sellon, whose paper ought to have the useful effect of convincing tramway authorities that it is most desirable to co-operate one with another with the object of connecting important districts by through services free from irritating and unnecessary obstructions.

LETTER FROM PARIS.

DURING the Christmas and New Year's festivities at Paris the streets always become a kind of public fair, the Boulevards from the Madeleine to the Bastille especially, and the dealers vend their wares in temporary shops which form a great disfigurement to the streets It was to provide for something better this year that the competition, already referred to in our pages, has been organised in one of the rooms of the offices of *Le Bâtiment*, where designs are assembled which are intended to suggest a better and more artistic type of temporary structure for these occasions. The "Société du Nouveau Paris," which originated the idea, has in preparation a plan also for the transformation of the Palais Royal, which the inhabitants of the quarter have so long called for. The scheme includes the opening up of the Palace, if not on its four faces, at all events on its north and south sides. The gardens, which are nearly as they were a century ago, it is proposed to replant. In the quarter thus transformed it is thought that sites might be found for public institutions, etc., on the ground left vacant by the gradual and continuous emigration of business establishments from

this quarter. It may even afford an opportunity for relieving the Pavillon de Flore at the Tuileries of the offices of the Colonial Office, the presence of which in that place is a danger to the treasures of the Louvre.

A conflict has arisen between the Société Centrale des Architectes and the Municipality of Paris on the subject of the ancient Hôtel de Ville. It has been proposed to put a tablet commemorating the old building, and the Société Centrale prepared one in which, following the conclusions of M. Marius Vachon, they worded the inscription to the effect that the Hôtel de Ville of Boccador was demolished and replaced by that of Pierre Chambiges. The experts of the "Comité des Inscriptions Parisiennes" maintain, on the contrary, that Chambiges merely continued the work of Boccador, finished in 1628 by Guillain. The question is rather futile, since in the conflagration of the building under the Commune all evidence that could be gathered from the work itself was destroyed. MM. Ballu and Deperthes reproduced faithfully the old façade, which was at all events a charming piece of Renaissance architecture; and that is really all that can be said with certainty.

This same Committee of inscriptions has just affixed a tablet to the last city residence of Bossuet, a house now No. 46, Rue Ste. Anne.

At the Petit Palais last week was inaugurated the collection of works by the sculptor and ceramic artist Carriès, offered to the city of Paris by M. Hæntschel. It consists of more than 300 works of great interest; among them are portrait busts of a large and powerful style, and a monumental gateway commissioned for her château, by the Princess de Montbéliard, and ornamented with quaint sculptures; there are also some curious experiments in ceramic work with metallic incrustations, etc. It is a remarkable collection of works to have been left by an artist who was cut off prematurely in the height of his career.

The Socialists of the Municipal Council, who are an even stronger and more intolerant body than are to be found in the State departments, are scandalised at the prominence of the great church on the hill of Montmartre, and have been actually demanding either that it should be demolished or that it should be turned to a secular use. It is not likely, however, that the necessary alteration in the law will be made; and failing that, they demand that there should be erected opposite to the church the statue of the Chevalier de la Barre, condemned and executed as a heretic under Louis XV. If the Government authorise this public homage, it it probable that they will unearth from the Magasins de Beaux-Arts at Auteuil a very poor statue of this victim of religious intolerance, by Emile Hébert, a sculptor of some talent, but whose work hardly merits this kind of prominence.

It does not appear that M. Besnard has any chance of the election to the post of Director of the Villa Medici; and that is all that one can be certain of at present. MM. Saint-Saëns and Barrias having both withdrawn their candidature, a new list has been presented, in which the name of M. Daumet, the eminent architect, occupies a prominent position. Whoever is ultimately appointed, it is understood that the new appointment is to be the occasion of a good many reforms in the administration of the Académie de France at Rome.

A committee has purchased Rodin's rather over-rated statue "Le Penseur," with the intention of presenting it to the City of Paris, the authorities of which, however, are by no means anxious for it and were not prepared with any site for it. However, it appears that the gift has now been accepted and the Place du Panthéon fixed upon as the site; the statue to be raised on a pedestal so as to cause it to stand out against the great bronze door of the Panthéon as a background. It is needless to add that there is little harmony of style between the statue and Soufflot's building, but that is a matter of little consequence to the Rodin-worshippers, who are still lamenting that the too-celebrated statue (?) of Balzac is not decorating some public place in Paris.

The lovers of Impressionism, which is now called "Art Moderne," will be gratified by the fact that the Government has authorised the exhibition at the Luxembourg of a collection of the works of Toulouse-Lautrec, to whose eccentric and disconcerting work attention has been drawn by the recently exhibited examples at Salon d' Automne.

The death is announced of the sculptor Maurice Ferrary, a Professor at the Ecole des Beaux-Arts. This talented artist was a pupil of Cavelier. In 1875 he exhibited a statue of Narcissus at the Salon. In 1882 he obtained the Prix de Rome; he had medals at the Salons of 1879, 1886, and 1889, and a gold medal in the 1900 exhibition. At this year's Salon he exhibited a bronze statuette, *à cire perdue*, of St. Michael.

The death is also announced, at the age of 88, of Mr. C. Augustin Salleron, a member of the Société Centrale des Architects, an architect of a good many buildings in Paris, of which the most important is the Mairie of the Twentieth arrondissement, in the Place Gambetta.

NOTES AND SKETCHES IN SOUTHERN ITALY.—V.

BARI.

BARI is an ancient city which has continued prosperous in modern times, and is the capital of a province and the most important commercial town in Apulia. Its 60,000 inhabitants live partly in the old town, which has narrow, tortuous streets and is very thickly populated, and partly in the new town, which is laid out in uninteresting quadrangles, in which the one object of interest is the Museum, housed in the Ateneo. It was a Greek colony, called by Strabo "Βαριον," by Pliny "Barium." Under Nero it was a Roman municipium. There is a tradition that the name comes from a pirate—Barione—who took the city at a very early date and destroyed it to build it larger. When excavations were being made for the later walls an ancient tumulus was found, which contained gigantic bones and military trappings with bronze medals bearing the ancient crest of the city—a Cupid shooting—which was thought to be Barione's tomb. It formed part of the Gothic kingdom, and was retaken by the Byzantines with the rest of the peninsula. It changed hands frequently, Saracens and Lombards disputing possession of it during the early mediæval period. In 690 it was taken by Romuald Duke of Beneventum with Brindisi and Taranto, but in 726 Gregory II.'s mediation obtained its restoration. In 802 it was again taken by the Prince of Beneventum, Sicard; and twenty-eight years later the Saracens relieved him of its government. In 860 Michael III. regained it for the Byzantines, and its possession was contended for between Lombard and Greek and Greek and Saracen till the Norman grasped it with tenacious hand, though the Venetians held it for a short time after 1002, when they wrested it from the Saracens. In 1046 Count Humfred negotiated for it, and Robert Guiscard did the same in 1064, but, negotiation proving fruitless, besieged it by land and water for three years, taking it in April, 1071. He was succeeded by his son Boemund, and it then became his uncle Roger's. Robert the Angevin gave it to his favourite, Amelio del Balzo, of the Provençal house of Les Baux, in 1324, and it remained a dukedom in the hands of his descendants till the middle of the XVth century. The Sforzas then had it, but soon gave it away, and in 1558 it was united with the kingdom of Naples.

The greatest misfortune which Bari has suffered was its destruction by William the Bad in 1156 as a penalty for revolt, when it is recorded that the only building left standing was the Church of S. Nicholas. It then lay waste for eleven years. Earthquakes damaged the city seriously in 1254, 1267, and 1730. The earliest notice of a Bishop of Bari occurs in the VIth century. It was, however, of sufficient importance for Urban II. to hold a council or synod there in 1098; the Antipope Anacletus held one also in 1131, and others met under the presidency of the Archbishops Antonio Puteo (in 1564) and Ascanio Gesualdo, Patriarch of Constantinople (in 1628).

The site of the ancient walls towards the land is now occupied by tree-planted piazzas, at the angle of which stands the Prefecture. Opposite is the Teatro Piccini, and towards the sea is a garden in which is a statue of the composer,

Fig. 1. East Window, Cathedral, Bari.

Fig. 2. Crypt of S. Nicola, Bari.

the rival of Gluck, who was a native of the city.

The strongest influence in the development of the various forms of art in Apulia was monastic. The Basilian monks, of whom there were as many as 1,000 in this part of Italy in 733, of course spread Byzantine feeling; and the Benedictines, who came a little later, continued the connexion with Constantinople as far as the art tradition went, though in other matters representing Latin influence, while also employing workmen from the north of Italy. The church at Bari was indeed tightly bound to Constantinople, the Catapan's residence there strengthening the political bonds. At Conversano there was a monastery in the VIIIth century, as also at Monopoli and Trani. The Benedictines were cerainly established in Bari in 978, but there are no remains of so early a date. They cultivated good relations with the Greek governors, and prospered exceedingly. Sgr. Carabellese says justly:—"They were agriculturists and artisans, artists, writers, politicians, and thinkers, like a new republic within the circle of which rich and poor, noble and plebeian entered without class distinction, bringing a precious dowry of power and activity in every relation of life and re-establishing civilisation and cosmopolitan thought. The land in which their house rose became a centre of action, extending itself to those surrounding with a wider circumference every day." They attached themselves to the Normans when they gained power, and thus became still more rich and powerful. When the body of S. Nicholas of Myra was brought to Bari in 1087, the relics were delivered over to the custody of the Benedictine Abbot Elias. The Order already possessed two churches dedicated to the saint, one in Bari and the other on the arm of the port of Monopoli, rebuilt about 1054 by a Barese craftsman—Mele di Martino. In documents of about this period other names of craftsmen appear:—"Lupo, magister, f. Ermefrid; Grisante, f. Guisoni; Mel, ferrario, f. Natali; Mel, patitario, f. Forzalis"; and that of "proto magistro Melo di Simeone da Bari," who in 1073 built the church of S. Nicola da Monte. He also superintended the work which was going on at the cathedral which was commenced by Archbishop Bisanzio in 1027. From a Greek document of 1032, we know that it was originally dedicated to the Virgin Deipara of Metizzia, and that it had the baptistery separate from the church—a Byzantine detail, though common also to Romanesque churches. The crypt was commenced in 1034. The same workmen were employed (Byzantines) who had built the churches of S. Saviour and S. Prisco in Bari, neither of which exist now. Bisanzio was succeeded two years later by Niccola (1035-61), a true artist, who belonged to the most powerful family in the city; he was elected by the vote of the people, and continued the work at the cathedral, but the eastern façade is due to Archbishops Angelo and Rainaldo, the latter of whom built one of the flanking towers, the other being of the period of Archbishop Giovanni, who held office between the two. The apse is round, but the screen wall between the two flanking towers hides its shape. In this wall is the fine window illustrated, Fig. 1, an arrangement frequently met with in the neighbourhood. Over the crossing is a beautiful octagonal cupola, with a finely-carved frieze crowning an arcade on corbels which are mostly heads of men and animals. This was built in 1178 with the transepts, one of which has a splendid rose window; the carving is like the east window, and makes its date certain. The roof was originally flat, which is proved by the disregard of the slope of the present one for the little columns round the cupola, which take the place of corbels at the angles, and at the second arch on each side. Some of the XIIth century roof timbers have been preserved, still bearing their coloured decoration. The building was not completed in 1245. In that year Angelo da Cicoria was superintendent. There is a central nave and aisles with triforium, and the western façade is divided by two pilaster strips answering to the nave and aisles in the Lombard fashion. There is a fine cornice to the façade, and a richly-carved hood mould follows the curve of the round window, and has figures of animals at the ends. The transepts and towers have double arcades, two smaller arches beneath a larger one, and the aisles are also arcaded, but with single arches. The nave has clearstory windows. The pilasters and arches beneath the matroneum or triforium simply butt against the transept walls, a proof that they are later; and the cornice also shows the original width of the façade. The arches were filled up about 1300 to make side chapels. None of this upper church can be older than 1156, the date of the destruction of the city by William the Bad. The sacristy is on the foundations of the ancient baptistery, and a wall has been found 9 ft. from the front wall of the transepts of similar construction to buildings in Sicily, with marble fragments carved with geometric interlacings and Arabic letters, which suggests the existence of a mosque here during the domination of the Saracens in the IXth century, who have left other relics, such as the tomb of a Sultan, preserved in the Museum. The floor of the cathedral is inlaid, and the central feature reproduces the design of the rose window of the principal façade. It is XIIIth century work, in which serpentine, porphyry, antique green and red marbles are made use of. Of the ancient altars which were made by Romuald, archbishop in 1292, only one remains. The high altar was consecrated February 6, 1233, by Bernardo

Costa, Archbishop of Palermo, formerly of Bari. Frederick II. was probably present, as he was certainly at Bari eleven days before. It was made by Anseramo of Trani, but only fragments of it remain worked up by Alfanus of Termoli in the XVth century. The ciborium is of the usual type, like that of S. Lorenzo fuori at Rome. It was consecrated in 1428 by Archbishop Francesco de Ajello. Some of the caps and the eagle from the ambo are preserved in the Museum. In 1745 great alterations were made, most evident in the interior and the western façade. At this time the lions from the west door were removed to the rococo courtyard of the archbishop's palace, where two stand upright by the stable door; two others crouch holding prey in their claws. The lower church or crypt has three rows of eight columns to support the vaulting and two at the arch of the apse. It was finished about 1178, and contains the relics of Angelarius, Bishop of Canosa, 845-68, in a marble sarcophagus, which were placed there in 1092. Those of S. Sabinus are also here, brought from Canosa in 1092 by Archbishop Elias. In the treasury is a very early Exultet roll (of the IXth century). Over the altar of S. Rocco is a picture by Tintoret, and opposite to it one by Paolo Veronese.

The church of S. Nicola, with its appurtenances, occupies the site of the dwelling of the Catapan, the imperial pretorian palace. There was a small Greek church dedicated to the saint at the beginning of the XIth century, which was almost attached to the palace, and had, in common with it, the great courtyard where the judges and imperial counts rendered justice and received public oaths. It is named in a document of 1048. When the relics of S. Nicholas were brought to Bari in 1087 Roger, son of Robert Guiscard, ceded the palace area to the Baresi, so that the sanctuary was free from episcopal jurisdiction, and the Benedictines immediately commenced to build a great church for them of which Abbot Elias was probably the architect. A large part of the material is Byzantine and Roman. In two years it was sufficiently finished for Urban II. to consecrate it. He was holding a synod at Melfi, and, on his way to Brindisi to consecrate the new cathedral there, stopped at Bari and on September 30, 1089, installed the abbot in the new dignity. The next day the bones of S. Nicholas were laid in the crypt, which must be the part which had been completed. According to the anonymous chronicler of Bari, the synod of October, 1098, was held in the upper church, and the bishop's throne, now preserved in the treasury, was made by Abbot Elias for Pope Urban II. to occupy on that occasion; but it was not consecrated till 1197, when Conrad of Hildesheim, imperial chancellor to Henry VI., officiated. Some say that it was finished by King Roger in 1139, who was crowned here in 1131 with an iron crown by the Antipope Anacletus II., according to an inscription of the XVIIth century at the entrance, which, however, makes mistakes about two other coronations named in it. The principal door of the façade was made by Ansaldo and Taddeo, "maestri comacini," and the equally fine north door, called "of the lions," by a Greek or Apulian named Basilio in 1105. Another door recalls the design of the inner portion of that of S. Maria in Piazza, Ancona, with twisted sections and bosses between. The master mason's name was Angelo da Fiumarello. An inscription gives the name of another mason "Magister Blasius." Abbot Elias is buried in a XIIIth century sarcophagus near the southern flight of steps to the crypt. The upper church is mainly the work of his successor, Eustasius (1105-23). The crypt (Fig. 2) has three rows of eight columns each and two in the apse; twenty-two pilasters in the walls receive the arches of the vaulting which they support. There is a legend that one of the columns threatened to fall during the construction, and that S. Nicholas appeared and kept it upright. It is now marked by an iron cage for the veneration of the faithful and to protect it from relic-hunters. The columns are most of them antique, as are many of the caps, above which are enormous abaci, but there are no bases. The altar is of silver. One was made in the XIVth century for the Servian king Urosius by Ruggiero dall' Invidia and Roberto da Barletta, but melted down in the XVIIth century by two Neapolitan silversmiths to afford material for the present one. From the tomb a fluid exudes known as "Manna di Bari" and thought to be miraculous.

The upper church (Fig. 3) has a nave and aisles, with a flat ceiling over the nave, carved, painted, and gilded, made by gifts of the Baresi, and vaulted aisles, above which is the matroneum. The nave arcade has double columns as at Trani in the three western bays, but the inner one seems an afterthought connected with the cross arches which were added by Francesco Sforza to strengthen the structure against earthquake. His arms are on the first one. The choir screen is original as far as its construction goes, but in the XVIIth century details of that period were added. The capitals resemble those at Cefalù. On one side of the entrance to the choir is a seat for the king, as at Monreale and Cefalù. The high altar was erected by Abbot Eustasius, as an inscription on the step says. The ciborium above it has the colonnettes above the architrave and the octagonal top which are seen at the cathedral. If this is contemporary with the altar (as is believed), it is the earliest example of the kind, that at S. Lorenzo fuori, Rome, being dated 1148. On the front of the architrave is a metal plate representing King Roger crowned by S. Nicholas, which is said by some to be niello in various colours (as in the bronze doors of the period) and by others to be enamel. M. Bertaux claims it as Limoges work of the middle of the XIIth century. The costume of the king is much like that of the mosaic at La Martorana, Palermo, but I was not able to examine it closely owing to the numbers of tapers placed all round the upper part of the ciborium in preparation for Easter. Behind it is the tomb of Bona Sforza, Queen of Sigismund I. of Poland and last Duchess of Bari, who died in 1558, and a small portion of the mosaic pavement remains. In a chapel to the right, the chapel of S. Martin, is a Madonna with saints by Bartolommeo Vivarini (1476), a lunette is above with Christ and SS. Nicholas and Francis. The north aisle contains the tomb-

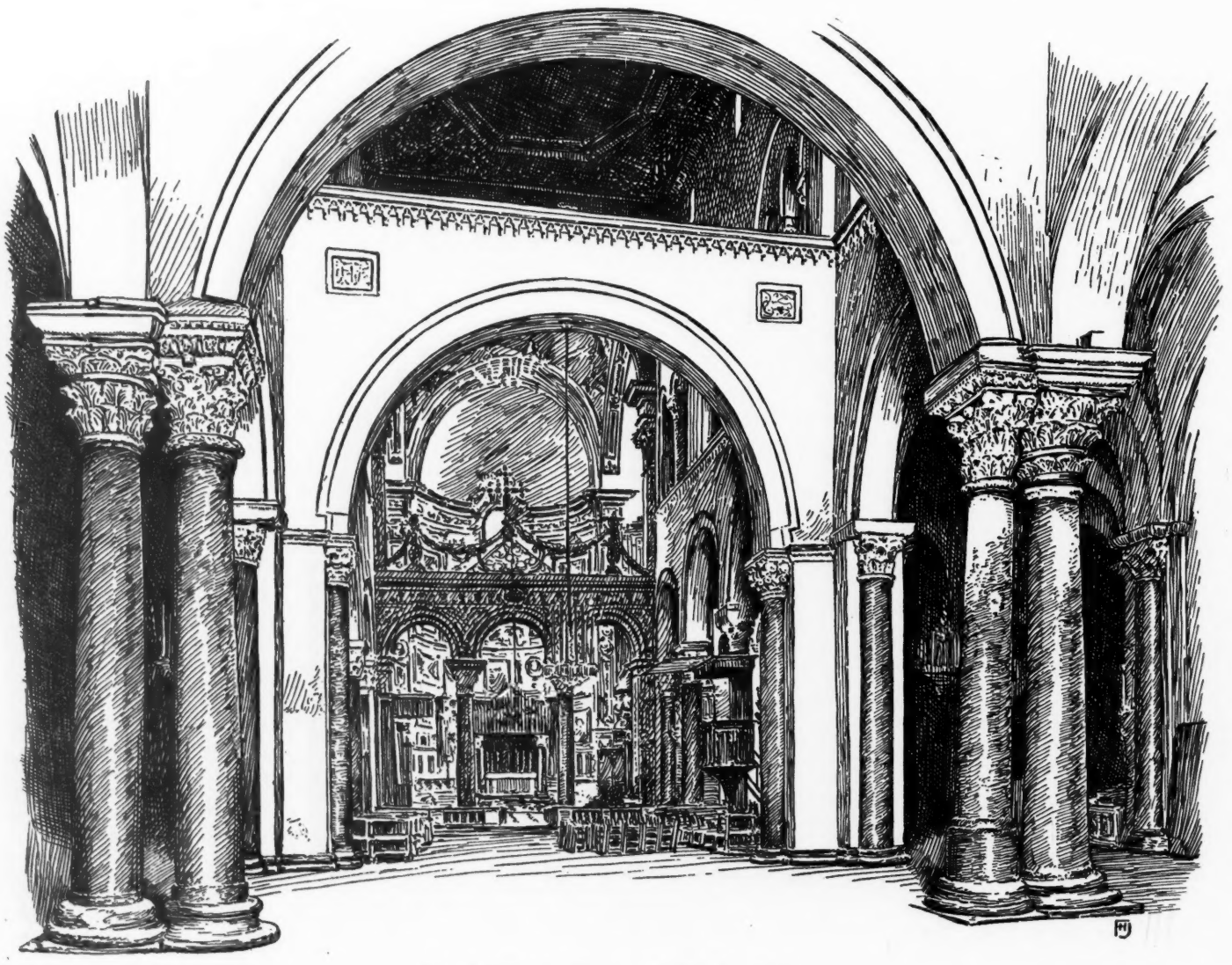


Fig. 3. Upper Church, S. Nicola, Bari.

stone of Robert, Count of Bari, protonotary of Charles of Anjou, who conducted the judicial murder of Conradin, the last of the Hohenstaufen, and was therefore slain on the spot by an indignant noble. The capitals of the columns of the matroneum (which resembles that at Trani) are many of them finely carved. Some columns have bases, some are without them, and some have been lengthened by the addition of small sections. At the end on the south a little two-light window looks into the transept. The base of the central colonnette is formed of an Early Byzantine cap turned upside down. The façade is divided by pilaster strips in the Lombard manner, but resting on columns at the bottom, and the walls have the usual arcadings supported on corbels. The central door is flanked by columns, which support a frieze ; above it is another arch with a figure of the patron saint in the tympanum and a pedimental termination. The arcading springs from this and the pilaster strips. Above the side doors is a similar arch, with two smaller beneath springing from a corbel above the centre of the door. The central gable has a moulded circular sinking at the top, and below that are three two-light windows, one above and two below, and the aisle walls were also pierced by smaller similar windows, now built up, which hug the pilaster strips in a curious manner. Encrusted in the walls are tombstones of noble families of Bari and of Byzantine pilgrims who died here. The treasury contains an illuminated breviary of Charles II. of Anjou and his sceptre, and an iron crown said to have been made at Bari in 1131 for King Roger ; also many pieces of goldsmiths' work, and Abbot Elias' marble seat, which bears on its sides the following inscription :—

"Inclitus atque bonus sedet hac in sede patronus
Presul Barinus helias et Canusinus."

The seat is supported on three crouching figures. The central one has a pointed cap, and supports the seat with his shoulder and keeps himself up with a club. At the back it rests on octagonal pillars and on a lion which holds a man's head in his claws. The footstool has two crouching lions. The ornament of the side has suffered a good deal, the panels are pierced. On the front are different animals in square compartments set diagonally. The crouching figures occur continually in architectonic sculpture of the period ; this is, perhaps, the earliest example. The entrances to the courtyard have pointed arches and are mediæval. The principal one has a figure of S. Nicholas above, with shields of Angevin arms at each side. Below are those of Raimondello Orsini (a rose and three bars), who died in 1405, and a blank shield. It was probably built under Giovanni I. of Anjou.

Close by is the little church of S. Gregorio, said to be the oldest church in the city. The façade has a central door, then three round-headed windows, each surrounded by a band of ornament and with pierced tympana ; above them is a large pointed arch, within which is a square-headed opening ; below this opening is a little arcade of four arches on colonnettes in couples with pierced tympana, and an ornamented band which returns down a gap in the middle. Four bracket corbels project on each side, and six more in pyramidal form round the arch, three on one side and two on the other with one at the summit ; they are carved with heads and beasts. The whole is enclosed between two pilaster strips with square, moulded tops and a gable. At each side is one little window, and then similar pilaster strips to the height of the roof slope of the aisles. The nave arcade has stilted, round arches, two groups of three on two columns, with a pier between and half columns at the end of each group. There are three shallow apses, of which the centre one is larger, and a clearstory of three little windows on each side at unequal intervals. The pierced slabs of the windows (like those in the cathedral transepts) and the general conception show Oriental influence, though several of the characteristic Apulian details appear here thus early. The church of S. Marco was founded by the Venetians in the XIIth century.

King Roger built a castle at Bari in 1131, employing Mussulman workmen. It was on the site of an older work, and one tower which still exists was raised on an earlier wall. The north-east angle is the oldest part, and is probably Romano-Greek, Sig. Avena says. It is built of large local stones without cement, and was restored by Frederick II. between 1233 and 1240. The archivolt of the west door and some caps show excellent carving. The eagle on it shows that it is of Frederick's time. Just beyond this door is a portico, on one of the abaci of which the name of Mele da Stigliano appears, while another is signed by Finarro da Canosa. Three large two-light windows on the north are Angevin work. The fortifications were strengthened by Isabel of Aragon and her daughter Bona, and bastions were added by the Bourbons. It is now a prison and caserne.

In the Piazza Mercantile is a much-worn lion on a kind of seat pedestal with the inscription "Custos justitiæ" on its collar. It was the heraldic cognisance of Bari. In S. Scolastica is a Romanesque fountain inscribed "Ursus laborator hujus fontis." In the narrow and winding streets one every now and then comes across a balcony of wrought iron, late in style, but effective, or a delicate two-light window with slender shaft, and the little shops are generally delightfully picturesque, niched into queer corners, or with much of their wares displayed outside in the street. The Museum contains a large collection of South Italian vases, a beautiful silver dish with heads in high relief, found at Taranto, architectural fragments of various dates, and photographs of interesting buildings in the surrounding country, the "Terra di Bari," which may be of assistance to the traveller who has not planned his tour completely as indicating places desirable to visit. F. H. J.

[In No. 2 of this series it was mentioned that the cope stolen from Ascoli had deen discovered in the collection of Mr. J. Pierpont Morgan. It is with great pleasure that I observe that Mr. Pierpont Morgan, with a graceful generosity, has presented it to the Italian Government.]

THE INTERNATIONAL GAS EXHIBITION.

II.—HEAT AND POWER.

Industrial Uses of Gas.—The most novel exhibit in the exhibition at Earl's Court is a naked gas flame burning continuously while completely submerged in water. The air required for combustion is mixed with the gas before the gas passes to the burner, and the products of combustion rise through the water with a bubbling noise. Explosion, or "back-firing," of the inflammable mixture of gas and air is prevented by keeping the mixture under a sufficiently high pressure (1 lb. to the sq. inch), and by using a specially constructed burner. The fact that an unprotected gas flame can be maintained under water was announced some years ago by a foreign experimentalist, we forget by whom, but this is the first occasion upon which we have seen the discovery put to industrial use. The exhibit is made by the Smethurst Furnace and Ore Treatment Syndicate, Limited, who have applied it for evaporation and other purposes. The same exhibitors also have on view a furnace heated to an intensely high temperature by a mixture of gas and air under high pressure.

As manufacturers of gas-consuming workshop and general industrial appliances the firm of Fletcher, Russell, & Company stand alone, and the exhibit of the firm in this class of goods easily surpasses that of any other exhibitor. Here may be seen crucible furnaces, muffle furnaces, ladle furnaces, soldering-iron heaters, blow-pipes, glue-pots, smoothing irons, coffee-roasters, and a number of other utensils dependent upon gas as a source of heat. The ease with which high and low temperatures may be attained, and maintained without variation for any length of time, renders gas an ideal fuel for the heating of drying ovens and for many other industrial purposes.

Water Heaters.—All the principal manufacturers of gas water-heaters have exhibits, and they appear to have almost attained perfection in the art of rapidly transmitting heat from a gas flame to water without undue waste of heat. Boilers and water-heaters of many forms may be seen, but bath water-heaters are the most prominent of the exhibits of this class. There is now no difficulty in obtaining a bath water-heater which will heat water rapidly, at small cost, and without emitting an obnoxious odour. The best exhibits bear so close a resemblance to one another that it would be useless to attempt to discriminate between them so far as their general utility is concerned. Gas water-heaters of good make may be safely used in bath-rooms if the products of combustion are led into a flue which has a constant up-draught even when the water-heater is not in use, and if they do not emit an offensive odour when in use. Emission of a stink is a danger signal. In selecting a water-heater care should be taken to choose one in which the flame does not remain in contact with a mass of cold metal, for such contact reduces the temperature of the gas flame, and results in the generation of the poisonous products of imperfect combustion.

A novelty in the form of a tubular boiler fitted on top of a gas cooker, and connected with an overhead water tank, is shown by J. Nutting. The boiler is in the form of a grid constructed of V-shaped tubes. Other boilers are placed at the bottom of the cooker. The object of these boilers is to utilise the heat which is usually lost when the cooker is at work, the water from the boilers being employed for washing crockery, etc. It is stated that these boilers are being fitted to the cookers employed on the Great Western corridor trains.

Excellent forms of water-heaters are shown by Ewart & Son, Ltd. ; Maughan's Patent Geyser Co., Ltd. ; Fenlon & Son ; Richmond Gas Stove and Meter Co., Ltd. ; and Fletcher, Russell, & Co., Ltd. A foreign exhibitor of water-heaters is Carl Flügge, of Hamburg.

Cookers.—From the smallest of ring burners to the mammoth cookers in which a tall man may stand upright, gas cooking appliances of all sizes and designs may be seen at the exhibition, but there are few striking novelties. The latest invention in cookers is probably the "Harris" grill, exhibited by A. E. Harris. This is a little oven which instead of having one row of small flames along each side of the bottom of the oven, has along its sides, from top to bottom, tier upon tier of small gas jets. The result is that food can be cooked in this grill much more rapidly than in an ordinary cooker. One would naturally expect that meat cooked in this way would be burnt on the outer surface and nearly raw in the centre. Impartial judges have, however, tasted food cooked in the Harris griller and declared it to be satisfactorily cooked throughout. J. Nutting exhibits a cooker in which the waste heat is utilised to heat water, but reference to this has been made under the head of water-heaters. Among the exhibitors of cookers are Cannon Iron Foundries, Ltd. ; Carron Co. ; the Davis Gas Stove Co., Ltd. ; Fletcher, Russell, & Co., Ltd. ; Imperial Stove Co. ; R. & A. Main, Ltd. ; Planet Foundry Co., Ltd. ; Richmond Gas Stove and Meter Co., Ltd. ; Wm. Sugg & Co., Ltd. ; Wilsons & Matthiesons, Ltd. ; and the Wright & Butler Lamp Manufacturing Co., Ltd.

Gas Fires and Stoves.—Although a great variety of these are exhibited they are too familiar to the general public to require description. A general improvement has of late years taken place in the design of many of these appliances, and in the form and composition of the ball "fuel" used. In our opinion the fires in which ball fuel is used are decidedly preferable to those provided with asbestos in strips or in bundles of short fibres. In selecting an "atmospheric" gas fire it is well to remember that the air-holes gradually get clogged with dust, and a fire so constructed that the burners can be readily handled and cleaned is more serviceable than one so constructed that it is difficult to get at the burners for cleaning. S. Clark & Co. exhibit several forms of their well-known "syphon" condensing stoves, and a number of firms show reflecting stoves of various designs. All the firms mentioned as exhibitors of cookers also exhibit gas fires and stoves.

Radiators.—Radiators in which circulating steam or hot water may be produced with the aid of gas are shown on several stands. Other gas-heated radiators are simply hot-air radiators. These radiators are very simple in construction, and are very compact. Among the exhibitors of radiators are Fenlon & Son ; Cannon Iron Foundries, Ltd. ; Ewart & Son, Ltd. ; and the Davis Gas Stove Co., Ltd.

Gas Engines.—Gas engines are well represented. On entering the exhibition the "Stockport" engine, manufactured by J. E. H. Andrew & Co., and exhibited by Bilbie, Hobson, & Co., the London agents, is first encountered. Engines of 40 B.H.P., 25 B.H.P., and 12½ B.H.P. are shown. The National Gas Engine Co., Ltd., Crossley Brothers, Ltd., and W. Grice & Son, Ltd., also have engines erected in the Prince's Hall. Crossley Brothers, Ltd., exhibit a high speed 27½ B.H.P. engine for electric lighting, and this engine has been utilised for driving the dynamo which supplies current for the incandescent electric lamps with which the firm's stand is illuminated. In the Queen's Palace

annexe, P. Simon & Co. exhibit a "Capel" gas engine driving a dynamo which is providing current for a number of electric arc lamps. At first sight this array of electric arc lamps appears a strange exhibit for a gas exhibition, but the object of the exhibit is to show that a gas engine is the best agent for driving a dynamo. Gas engines are also exhibited by J. Firth Blakeley & Co., and Geo. Waller & Son.

Miscellaneous Exhibits.—Gas meters of all descriptions are exhibited by the principal meter manufacturers. A discount or check meter exhibited by the "Rotary" Meter Syndicate, Ltd., is a novelty. Scientific apparatus is shown by several firms. Wm. Sugg & Co., Ltd., exhibit photometers and apparatus used for testing the heating power and purity of gas. Townson & Mercer exhibit chemical apparatus. Siemens Brothers & Co., Ltd., exhibit a water pyrometer and an electrical resistance pyrometer. In the loan collection is a photometer for high-power lights lent by Mr. C. C. Carpenter. A device for lighting burners from a distance is shown by the Pneumatic Gas Lighting Co., and a clockwork arrangement for automatically lighting and extinguishing a gas burner at any desired hours of the day or night is shown by the Automatic Light Controlling Co., Ltd. Mechanical conveyors for coal or coke, machines for charging retorts, and appliances for purifying gas are shown by a number of engineering firms.

It has been impossible in the limited space at disposal to enumerate all the exhibits now on view at Earl's Court, but from such notes as we have been able to publish it will be seen that many of the exhibits are of interest to all who are concerned with the lighting or heating of buildings, or with the lighting of open spaces.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE third general meeting (business and ordinary) of the present session of the Royal Institute of British Architects was held at No. 9, Conduit-street, Regent-street, on Monday, Mr. T. E. Collcutt, Vice-President, in the chair.

The minutes of the last meeting having been taken as read, the decease of the following members was announced, *i.e.*, Mr. C. J. Ferguson, F.S.A., Associate, of Carlisle, and Mr. Francis W. Bedford, a Fellow and Ashpitel prizeman and Owen Jones student.

Elections.

The following gentlemen were then elected as members, *i.e.*, as *Fellows*—Messrs. W. A. Aickman, Gresham-street, E.C.; S. N. Chandabhoy, Bombay; J. B. Chubb, Foundling Hospital, W.C.; B. J. Dicksee, New Kent-road, S.E.; W. Dunn, Lincoln's Inn Fields, W.C.; F. Emley, Johannesburg; A. C. Forrester, Old Queen-street, S.W.; A. L. Guy, Gray's Inn, W.C.; W. Leck, Johannesburg; E. C. P. Monson, Acton Vale, W.; H. A. Pelly, Old Broad-street, E.C.; E. Thornton, Calcutta; W. F. Young, Norfolk-street, Strand, W.C.; R. Watson, Lincoln's Inn Fields, W.C. As *Associates*—R. J. Allison, H.M Office of Works, Westminster; E. G. Allen, Croydon; W. H. Bagot, Adelaide, South Australia; W. J. Ball, Crewe; E. Bates, East Croydon; C. Batley, Kettering; W. E. A. Brown, Regent-street, S.W.; A. N. Campbell, Bloomsbury-square, W.C.; W. A. T. Carter, Wimbledon, S.W.; C. M. Childs, H.M. Office of Works; B. C. Chilwell, Wednesbury; C. B. Cleveland, Whitehall-place; N. Culley, Huddersfield; S. C. Curtis, Holborn, W.C.; W. T. Curtis, West Dulwich; W. J. Davies, Sidcup; A. H. Gloyne, Richmond; H. P. Gordon, Blomfield-street, E.C.; P. W. Hawkins, Westminster, S.W.; B. B. Hooper, Dunedin, New Zealand; V. Hooper, Redhill; P. C. Pilling, Bolton; K. D. S. Robinson, Westminster; G. A. Ross, Montreal, Canada; T. T. Sawday, Leicester; A. Scott, jun., Dennistoun, Glasgow; N. O. Searle, Paternoster House, E.C.; R. E. Stewardson, Pall Mall East, S.W.; F. E. Stratton, Theobald's-road, W.C.; P. J. Westwood, 130, Jermyn-street, S.W.; G. H. Widdows, Derby; F. Wilson, Sheffield. As *Honorary Associate*—Count Plunkett, B.L., F.S.A., M.R.I.A., Dublin.

It was announced that the following are the gentlemen who passed in the November examinations. One hundred and ninety-five candidates were admitted, and of these fifty-eight were exempted from sitting. The remaining 136 were examined, with the following results:—

The Preliminary Examination.

A. J. T. Abel, Fulham, S.W.; J. E. Adamson, Manningham, Bradford; A. G. W. Allen, Roundhay, nr. Leeds; J. C. Anderson, Lee, S.E.; F. Bacon, jun., Battersea Park, S.W.; F. A. Baldwin, East Acton, W.; E. H. Ball, Dinnington Colliery, Dudley, R.S.O., Northumberland; C. D. Barber, Romford, Essex; T. C. Barker, Scarborough; V. S. Barnes, Carmarthen; H. Battiscombe, St. Mary Cray, Kent; W. Beswick, Chester; B. W. Billinge, Farnham, Surrey; A. G. Blackford, Ealing, W.; C. V. H. Blackwall, Hullandward, Derby; B. J. Boothroyd, Brockley, S.E.; J. E. Bownass, London; H. Bradley, Blackpool; H. E. Bunce, Clapton, N.E.; W. H. Burgum, Edgbaston, Birmingham; F. M. Burr, Hornsey Rise, N; E. G. Catchpole, Ipswich; R. A. Chadwick, Blackpool; R. T. Chapman, Bolton; P. J. Clarke, Heswall, Cheshire; O. Coghlan, Cheltenham; E. S. Coldwell, Kensington, W.; F. W. Commin, Exeter; C. Cooke, Southend-on-Sea; G. V. Cooke, Eastbourne; C. J. M. Cowdell, Leicester; J. Crabtree, Blackpool; J. D. Crawford, Bishop Auckland, co. Durham; C. E. S. Davies, Hafody-Coed, Llanfairfechan, N. Wales; C. R. Davy, Maidenhead; A. H. L. Daw, Cardiff; H. A. Dickman, Sherwood, Nottingham; G. Duncan, Rochdale; S. Edwards, Barnstaple; W. H. Elsdon, Dalston, N.E.; W. S. A. Emden, Hampstead, N.W.; C. G. Evans, Neath; F. Fernyhough, Didsbury, nr. Manchester; D. H. Fish, Chigwell School, Essex; H. S. Fleming, Moorlands, Bingley; G. H. Foggitt, Ash Field, Yeadon, nr. Leeds; O. Gaunt, Camden Town, N.W.; B. S. W. Gilbertson, W. Hartlepool; K. Glover, Wylam, R.S.O., Northumberland; W. Goodchild, Ispwich; G. D. G. Hake, London; H. W. Hallas, Huddersfield; J. C. Hardy, Nottingham; S. Harrison, Linthorpe, Middlesbrough; A. P. Hartnell, Bristol; J. S. Harvey, Clapham Common, S.W.; W. H. Hatchard-Smith, Epsom; C. D. Hawley, Ipswich; H. C. Haworth, Chorley; J. A. S. Haworth, Huddersfield; I. Henderson, South Shields; L. K. Hett, Rugby; A. Hewetson, Leeds; H. R. Holland, Southport; P. E. Holland, Bexley, Kent; J. H. Hood, London; P. Howard, Waterloo, Ashton-under-Lyne; T. C. Hughes, Claughton, Birkenhead; G. B. Jackson, Newcastle-under-Lyme; R. Jacques, Knaresborough; J. McN. Jeffrey, Pimlico, S.W.; J. R. Johnstone, Ayr, N.B.; G. B. Kaufmann, Sutton; S. V. Kendall, South Croydon; P. K. Kipps, Lewisham, S.E.; S. M. Kirkman, Croydon; F. Lambrick, Burton-on-Trent; T. S. Linton, London; F. A. Llewellyn, Richmond; H. S. Lockhead, Stroud Green, N.; H. J. Luck, Leighton Buzzard; C. B. Lyne, Cheltenham; G. N. Lynn, Newark-on-Trent; R. J. MacDonald, Inverness; A. J. McLean, Brighton; C. S. Madeley, Perry Barr, Birmingham; T. C. Mannooch, London; G. F. Marshall, Leek; C. J. F. Martindale, Wetheral, Carlisle; H. E. Matthews, Yeovil; S. W. Milburn, Sunderland; W. Milburne, Bishop Auckland; C. J. Mole, Plymouth; W. Moor, Morecambe; E. J. E. Moore, Newport; C. O. Moreton, Edgbaston, Birmingham; W. E. Müllerhausen, Forest Gate, E.; W. W. Neat, Brynmawr; D. E. Oram, Croydon; W. A. Orton, Harehills, Leeds, N.; W. Park, London; G. E. Pearse, Johannesburg; A. T. Phillips, Rickmansworth, Herts; H. G. Phillips, Richmond; A. D. Philpott, Dover; R. Pierce, Llanfair, P.G., Anglesey; D. J. G. Plumley, Clifton, Bristol; R. S. Ponting, Kingsdown, Bristol; W. W. Price, Liverpool, S.; C. E. F. Prynne, Bedford; S. G. Reilly, Bayswater, W.; W. G. Relph, Carlisle; L. A. Reynolds, Newington Hall; J. B. Richardson, Shotley Bridge, co. Durham; P. Richardson, Thornton Heath, S.E.; S. Riches, Balham, S.W.; F. A. Roberts, Ty Brith, Mold; S. Robertson, Dumbarton; F. J. Robinson, Benton, Northumberland; F. C. Robson, Brixton, S.W.; H. E. Rolley, Bulwell, Nottingham; J. A. Ross, Edinburgh; G. C. Rubie, Dover; H. J. Ruddle, Watford, Herts; A. Rylatt, Hull; W. H. Sagar, Blackpool; S. G. Scales, Westcliff-on-Sea, Essex; G. D. Scammell, Redland, Bristol; S. M. P. Sheppard, Camberley, Surrey; A. S. Slater, Bensham, Gateshead; T. Spencer, Putney; G. R. Stanislaus, Bayswater, W.; W. C. Steljes, South Tottenham, N.; G. J. T. Stemp, Newport; J. J. Stout, Stockton-on-Tees; R. V. Sturgeon, Whalley Range, Manchester; F. Suddards, Bradford; M. C. Sunter, Chorlton-cum-Hardy, nr. Manchester; T. S. Tait, Paisley; J. H. Taylore, Whitley Bay, R.S.O., Northumberland; F. D. Thomson, Dundee; A. I. Turner, Forest Gate, E.; A. Walmsley, Haslingden, Lancashire; R. A. Walter, Harringay, N.; S. K. Watkins, Rotherham; R. A. Welch, Croften Park, S.E.; W. B. Wheatley, Hull; W. G. Whincop, Stoke Newington, N.; A. E. M. Whitehouse, Heaton Moor, Stockport; H. Whittaker, Accrington; H. S. Whittingham, St. John's, S.E.; H. G. Wicks, Bournville, nr. Birmingham; J. P. Williams, Llangollen, North Wales; F. C. Wilson, Edgbaston, Birmingham; N. F. S. Winter, Blackpool; L. S. Wood, London; W. E. Woodin, Anerley, S.E.; J. Woollatt, Nottingham; C. H. Wright, Aylesbury.

The Intermediate Examination.

G. Nott, Leicester; W. Harvey, Kennington, Ashford, Kent; P. M. Fraser, Streatham-hill, S.W.; H. L. Samson, Balham, S.W.; S. J. Webber, Maidenhead; S. S. Waghorn, St. John's Park, N.; L. S. Wood, London; P. Dalton, Birkdale, near Southport; E. L. Wren, Leicester; H. A. Beeston, Dover; J. S. Cable, Brixton, S.W.; A. G. Lynham, Exeter; C. H. Potter, Matlock Bridge; F. G. Oliver, Tweedmouth, Berwick-on-Tweed; A. D. Aitken, Airdrie; R. H. Blackburn, Manningham, Bradford; H. Blackadder, Broughty Ferry, W., Scotland; W. P. Schofield, Leeds; A. E. Beswick, Swindon; G. H. Parry, Upper Warlingham, Surrey; W. L. Mellor, Halifax; D. W. Ditchburn, Leytonstone, Essex; R. G. Roberts, Stafford; L. S. Fifoot, Penarth; F. N. Bamford, Bloomsbury, W.C.; T. S. Attlee, Putney, S.W.; F. L. Atwell, Plumstead, S.E.; F. H. Bulmer, Balham, S.W.; T. H. O. Collings, Hove; W. F. Dickinson, London; J. P. Firth, Walton, nr. Wakefield; B. W. Fitch-Jones, Bexhill; H. French, Hull; E. H. Gandy, Canonbury, N.; J. H. Gask, Stamford-hill, N.; J. H. Goodchild, Finchley; G. H. B. Gould, Ipswich; J. H. Hargeaves, Fulham, S.W.; A. J. Healey, London; F. B. Hooper, C.-on-M., Manchester; W. Jackson, Hitchin; W. Kerr, Putney, S.W.; H. G. Lay, Wellingborough; A. S. W. Mackay, Barking, Essex; M. R. Martin, Chiswick; A. M. Millwood, Barnes, S.W.; G. E. H. Newbold, Gainsborough; G. W. Page, Bolton; J. A. Pirie, Highbury, N.; H. A. Porter, Gravesend; A. Rigby, Manchester; H. E. Seccombe, Clapham Common, S.W.; A. F. Slaughter, Reading; J. C. Smythe, Mutley, Plymouth; B. H. Sutton, Basildon, near Reading; W. I. Travers, Kensington; G. M. Trench, Honor Oak, S.E.; R. J. Tyndall, Maida Vale, W.; F. A. Walker, Hampstead, N.W.; J. B. Wills, Clifton, Bristol; W. B. Wyllie, London; S. A. S. Yeo, Exeter.

The Final and Special Examinations.

T. F. Amery, Chelsea, S.W.; D. Anderson, Hampstead, N.W.; E. G. G. Bax, Catford, S.E.; W. S. Beaumont, Manchester; M. S. Briggs, Otley, Yorks; J. S. Brocklesby, St. James's S.W.; J. T. W. Brooke, Bowden, Cheshire; C. F. Callow, St. Leonards-on-Sea; C. P. Carter, Mansfield; G. R. Ellis, Longsight, Manchester; J. A. Fletcher, Leicester; H. C. Fread, East Molesey; W. J. Freeman, Halifax; C. L. Gill, Regent's Park, H.W.; H. H. Golding, Woolwich; P. A. Hinchcliffe, Barnsley; P. A. Horrocks, London; A. B. Hubback, Kuala Lumpur, Selangor, Federated Malay States; D. B. Jenkinson, Kimberworth, Rotherham; G. A. Johnson, Croydon; J. Miller, London; C. Nicholas, Tooting, S.W.; H. L. North, Llanfairfechan, N. Wales; C. T. Palmer, Stamford-hill, N.; C. Paterson, Bowdon, Cheshire; A. R Powys, Denton, Grantham; E. Quiggin, Blundellsands, Liverpool; G. S. Salomons, Manchester; H. R. Smallman, Wimbledon Common, S.W.; N. C. Smith, Moffat, N.B.; E. G. W. Souster, Northampton; C. J. Thompson, Wandsworth, S.W.; J. N. R. Vining, Sydenham, S.E.

The following shows the number of failures in each subject of the Final:—

I. Design	28
II. Mouldings, etc.	34
III. Materials	18
IV. Sanitation	14
V. Specifications	11
VI. Construction: Foundations, Walls, etc.	19
VII. Construction: Iron and Steel, etc.	27

The Ashpitel Prize.

On the recommendation of the Board of Examiners the Council have decided to award this prize to Mr. Charles Lovett Gill, he being the candidate who has most highly distinguished himself in the Final Examinations held during the current year.

The Chairman moved "that the Registration Committee appointed by the general body be allowed to co-opt additional members," and this was agreed to.

Mr. G. A. T. Middleton moved "that it be referred to the Council to consider the

advisability of appointing an official assessor of architectural competitions." The Chairman accepted the motion on behalf of the Council.

Reinforced Concrete.

A discussion then took place on the papers on Reinforced Concrete, read on the 21st ult. by Messrs. W. Dunn and M. L. G. Mouchel.*

Mr. De Vesian read a communication from M. L. G. Mouchel in which he referred at some length to the question of formulæ and methods of calculation with regard to ferro concrete. He said that there were concrete specialists who were wasting their time in formulæ, for often if they followed them they would arrive at absurd results. In regard to his work every case was considered separately and was gone into as a fresh problem. Although he had not great faith in the hydraulic test, he had made such tests. In 1901 the Mersey Docks and Harbour Board tested a pillar at 245 tons per sq. ft. As a matter of fact, however, he had had a good many pillars in actual use under varying conditions for many years, and these pillars had been subjected to eccentric tests of a severe character and stood the trials, and he claimed that such facts as these were worth tons of theory. Mr. De Vesian afterwards exhibited a large number of lantern slides showing how ferro concrete had been used, and was being used, in the construction of warehouses, mills, factories, bridges, piers, etc.

Mr. Watson expressed the great regret that Mr. Dunn felt at being again unable through illness to be present, and said that Mr. Dunn had asked him to read some replies to questions which had been sent to him by letter. The first question was as to the effect of temperature on the rate of setting of cement, and this had been fully investigated by Professor Tetmajer in the laboratory of the University of Zurich. These reports were not easily got in this country, but extracts showing the effect of temperature on the rate of setting of cement would be found in Johnson's "Materials of Construction," which should be found in the library of the Institute. Investigations were made as to the ways in which the time of setting for tensile strength are influenced, and they might be expressed by means of graphical representations. For these researches cement was used, the normal time of setting of which was one and a half hours, and the normal tensile strength of which was 23 kilos in 28 tons. In the experiments, both the cement and water were brought to a temperature, and it was shown that a cement which had the normal temperature of 16° centigrade and had a setting time of one and a half hours at 7° centigrade, which was winter temperature, it did not set in five hours; while in 30° centigrade it set in twenty-six minutes. If temperature were left out of consideration, a medium-setting cement might be found either slow or quick-setting, and many complaints which had been made were thereby explained. The results of the experiments were these :—At 7° centigrade the time of setting was five hours; at 10° centigrade, three hours; at 16° centigrade, one hour thirty minutes; at 23° centigrade, fifty minutes; at 30° centigrade, twenty-six minutes. When cement and mortar set at a temperature below freezing-point, the water it contained was likely to freeze and the mortar could not properly harden and became disintegrated, and so it was customary in frosty weather to use some salt in the water for mixing mortar to prevent the freezing. Another question was asked as to the amounts of materials for concrete. When the aggregate was mixed and rammed, the finished concrete occupied much less space than the various constituents did separately. The results of actual measurement showed that 586 lb. of cement was required for each cubic yard of rammed concrete. The other question asked was as to a diagram figure for Marsh's formulæ. This was not mentioned in the paper, but was given on page 288 of Marsh's "Reinforced Concrete."

The Chairman, in calling on Mr. Marsh to speak, explained that that gentleman was the author of two volumes concerning reinforced concrete, which were in the library.

Mr. Marsh said there were only two things he would like to refer to in Mr. Dunn's paper. In the first place, Mr. Dunn stated that cement with no free lime could be manufactured, but he thought that this was seldom the case. Even with the rotary kilns, when the clinker came out they saw small uncalcined bits. It was practically impossible to pick these out, and they went through the grinding mills with the rest of the clinker. He believed there were some firms who introduced a jet of steam in the tube mills, which had practically the same effect as air slacking, but he did not think this was a general practice. Another remark of Mr. Dunn was that no formulæ had been devised for columns which took into account initial stress. He felt that any such formulæ would be very unreliable. The stress induced in concrete varied so very much according to the dampness of the atmosphere. When concrete with reinforcement in it set in dry air, there were tensile stresses induced, but if it set under water the stresses are compressive. Consequently, if they had a formula which took into consideration initial tensions, and the air happened to be damp when the column was setting, they might have initial compression, whereas what they had taken into consideration was tension. Hence, any formulæ which did not take into consideration the exact conditions existing when the column was hardening would be unreliable. M. Mouchel's paper was an excellent statement from the practical view of reinforced concrete, but it would have been better had he treated the subject more generally. M. Mouchel simply dealt with the Hennebique system. It was an excellent system, but it was only one of many systems, each of which had good points, many being just as good as M. Hennebique's. Of course, one could not be surprised that M. Mouchel should only speak of his own system, and they could not blame him for it. The Hennebique system was, he believed, the first to be commercially introduced into this country, but he was not sure that the Expanded Metal Company was not really the first. Besides the Hennebique system, there were others represented in England, amongst which were the Wayss und Freitag, an offshoot of the firm which exploited the old Morrier patents and was a very old firm. This firm was represented by Mr. Werner of the Armoured Concrete Construction Company. M. Cottançin had also constructed several buildings and water tanks in this country, and several other systems had representatives in London. As reinforced concrete became more generally understood and known in this country, he hoped that there would be other systems brought forward. American systems in particular would be introduced, and he believed it would be a good thing for all of them when they were. The stirrups which M. Mouchel mentioned were specially useful for tying together the layers of the concrete. The layers had to be put in in small thicknesses and very often after considerable lapse of time, and, consequently, it was very beneficial to have these stirrups to tie them together. Many other constructors use this form of reinforcement. Some of them attach them to the longitudinal bars, which is an excellent thing, as it tended to resist the sheering along the main reinforcements. The bent-up rods which M. Mouchel mentioned as being used to resist the tension over the supports were also extremely useful in resisting the shearing. With respect to columns, Mr. Dunn had very clearly shown the nature of failure. The horizontal bindings usually employed in columns are not sufficiently close together to resist the swelling and shearing of the concrete. There was no doubt that the hooped column introduced by M. Considère was the most efficient form of construction. He was surprised that M. Mouchel should have spoken of M. Considère as being unpractical, for he considered him one of the greatest authorities on reinforced concrete. It might interest them to know that M. Considère's patents had been taken up by the Armoured Concrete Construction Company. M. Mouchel had said that no system could compare with M. Hennebique's in simplicity, but Ransome's system in America was almost identical with Hennebique's, and many others were quite as simple. American architects and engineers were now taking up the design and construction of their own buildings in reinforced concrete, and they always applied the reinforcement in a simple and scientific manner. M. Hennebique was certainly one of the first to introduce the reinforced concrete beam, but Ransome in America, Cottançin and Coignet in France, and Möller in Germany, introduced it about the same time, and there seemed to be some doubt as to who was the first. Every honour was due to the pioneers of this material, and there was no doubt that M. Hennebique ranked very high amongst them. With reference to the formulæ used in ordinary reinforced concrete structures there was not the slightest doubt that it was right to take into consideration the elasticity of the two materials, and he would just explain the nature of the effects on concrete under pressure, which would show the reason why elasticity should be taken into account. When concrete was first put under pressure it contracted very considerably, and on the load being removed there was a very considerable permanent set. If the same load was applied again there was still a distinct shortening, and still a permanent set. If they applied and removed the load several times they would go on having a shortening and a permanent set, but these became less and less as they kept on applying and removing the loads until at last there was no permanent set at all, and the shortening was very considerably less than the shortening under the first loading. They would see what effect that had when reinforcement was introduced. Under the first load or test the concrete contracted considerably. Consequently the reinforcement which took up the same contraction as the concrete could take a very considerable amount of stress. After the concrete had taken its permanent set it contracted considerably less, and consequently after the structure had been loaded several times the stress taken by the reinforcement was very much less than under the first load. That of course applied not only to columns but also to beams. Many constructors now used a formula based on elastic resistance. The American systems generally used formulæ which took into account the elasticity of the two materials. The comparatively great elongation of reinforced concrete as compared with plain concrete was due to the presence of the reinforcing metal. The reinforcing metal takes up the stress and distributes them over the whole length of concrete, and if there are any weak sections the reinforcing metal carries it over the weak section and takes it to the stronger section. Also when a crack did occur the reinforcement acted exactly in the same way. M. Mouchel implied in his paper that laboratorial experiments on reinforced concrete were unreliable and were not conducted on pieces of practical dimensions, but most of the experiments on this material during the past few years had been conducted on pieces of practical dimensions, and the mixtures of concrete and other necessary details had been carefully noted. It was to be hoped that such experiments when properly interpreted would lead to the establishment of true formulæ. Of course even the best formulæ at the present time were not absolutely correct, but when they thoroughly understood the nature of the properties of this material which they were rapidly learning by these excellent experiments, there was no doubt that absolutely true formulæ would be found which would be generally employed. With reference to the acceptance tests of floors he thought that the load ought to be applied across the whole width of the floor. If it was only applied over one beam or bay they did not get a true result, because the whole of the floor acted together, and the beams at the side helped to carry the load. Thus if they applied the test load over only one beam or two beams it was not sufficient, and the load should be applied across the whole width of the floor. One of the most valuable properties of reinforced concrete was its monolithic nature. Each part acted with the other, in resisting the stress, and the way in which a reinforced structure resisted being knocked about and generally damaged had been very well shown by M. Mouchel in the photographs he had shown of the tramway car shed and the coal silos where there had been accidents. There was also a very good demonstration of this in the destruction of the San Moreno Pavilion constructed by M. Cottançin for the Paris Exhibition in 1900. That pavilion measured 35 ft. by 30 ft., and was about 39 ft. high; the top 24 ft. of the height was only supported at each corner. After being subjected to very severe fire tests the three supports at one corner were broken away one after the other, and the building only collapsed after the three supports were knocked completely away. The reinforced concrete pile was of the greatest use, and its introduction was entirely due to M. Hennebique. Its excellent qualities were too obvious to need any further comment; nor did M. Mouchel's excellent demonstration of the several advantageous qualities of reinforced concrete require enlargement excepting that he might point out that other systems possessed the same

* See our issue for November 26.

qualities. He cordially agreed with M. Mouchel in the main in what he said as to the by-laws governing reinforced concrete construction, but he disagreed with him on the subject of formulæ. It was very necessary indeed that formulæ should be inserted. Some of the restrictions as to design which had been instituted by various authorities up to the present were too severe, and that of the Prussian authorities for columns was ridiculous, but this latter was due to the very low working stress allowed on the concrete which was only one-tenth the ultimate resistance. It must be remembered that the constructors did not take the eventual responsibility for the structures, and as the responsibility fell on the authorities it was perfectly right that they should institute methods of calculation to guard themselves in every way. He hoped if any by-laws were framed they would institute no such absurd requirements as line D in figure 9 B, but at the same time some formulæ should be insisted upon which would meet the general requirements, although they might not come up to the ideals of some constructors.

Mr. H. Anderson, as a manufacturer of Portland cement, said he was glad to be able to listen to such papers. This material was one into which cement largely entered, and naturally he had followed its development with interest. Mr. Dunn had alluded to the fact that if the cement was bad when the concrete was made cracks formed. It would not be safe to assume that this was due to the quality of the cement. It was equally necessary that the materials forming the aggregate should be of the first quality, and that great care should be shown in mixing the cement with the aggregate. He must say that a combination of the high tensile strain of steel with the great crushing resistance of concrete formed an ideal amalgamation, and it was a matter for regret that in this country ferro-concrete had made such slow progress compared with the rapid strides made both on the Continent and in the United States of America. This leisurely movement in England he put down to two causes, and the first of these was the antedeluvian restrictions of the building by-laws. Secondly, it was due to the little attention given to this science, as he called it, by the technical Press of the country. He hoped that the papers which had been given before what he understood was a record attendance in that building would do something towards giving a stimulus to the interest shown in the material, and would encourage the technical Press to give more attention to the subject, and thus remove the necessity of those who wished to know something of the latest developments having to go to American and Continental journals.

Mr. H. K. G. Bamber, Managing Director of the Associated Portland Cement Manufacturers, Limited, said he would like to refer to the question of specifications and tests which Mr. Dunn proposed. Mr. Dunn said it would be very beneficial to the profession and the trade generally if some sort of standard specification could be adopted. He quite sympathised with Mr. Dunn when he said that engineers and architects were in great difficulties as regards their specifications, he had no doubt that it was so. There was no doubt that every engineer or architect there liked to frame his specifications in accordance with his own views, and it would be a great advantage if they would compare these and see the immense variation there was between one and the other. As they knew, a Standardising Committee had been sitting, and had now completed its deliberations. That Committee was composed of representatives of the engineering and architectural professions, contractors, and Portland cement manufacturers. They had heard a good deal of the English manufacturer not being up-to-date, but in this particular case in framing a specification, which was perhaps the most stringent yet put into force, the representatives of the cement trade were the prime movers in working up that specification to the highest possible standard. He believed that specification would shortly be made public, and he hoped those members of the profession who were about to alter their specifications would await its arrival before embarking on new conditions. They could imagine that an architect who framed his own specification found it difficult, and they could imagine also the difficulty of the cement manufacturer who had all these various specifications put before him. He would welcome the time when the architectural profession and the engineering profession generally adopted some standard specification, and relieved the cement manufacturer from the difficulty of trying to comply section by section with the specifications he had given him day by day. Mr. Dunn had referred to the fineness of grinding, and he would point out that of late years cement was ground much finer than in the past. The profession probably did not realise what an immense difference that made to the properties of cement. It made the cement much quicker setting for the reason that a large proportion of the material which formerly constituted cement had absolutely no cementitious value, whereas now, by much finer grinding, it was brought into use, and the avidity with which the cement took up water and the chemical action resulting was much greater than in the past. It was much more quick-setting, and methods had been adopted to regulate the setting time. The custom in Germany, and also in England had been to add a small percentage of gypsum, which had the effect of retarding the setting time. Many engineers, however, had a great objection to the addition of such material, and in order to get over that difficulty, and regulate the setting time in accordance with the requirements of various specifications, a method which Mr. Marsh referred to had been invented by himself and largely employed. By this means they were able to make cement of the highest quality and regulate the setting time without the aid of gypsum at all. The effect of the hydrating process was partly a chemical one, and much improved the soundness of the cement. Mr. Marsh referred to the question of free lime and rotary kilns. He had perhaps the largest installation of rotary kilns in the United Kingdom under his control, and although Mr. Marsh said there did appear at times to be very small particles of free lime passing through; the percentage of half burned obtained by that process as compared with cement manufactured by the older processes was infinitesimal, in fact, the percentage could hardly be measured.

Mr. Hannen, jun., of W. Cubitt & Co., who are licencees under the Hennebique patents, said a few words on ferro-concrete from the contractor's point of view. He might say at once that, so far as the scientific part of the business went, he knew nothing about it. Mr. Dunn some years ago asked him to look into the question as to whether they were getting the best cement that could be made. He went into the question carefully with Mr. Dunn, and the result was that they had now a specification which he thought was more stringent than any in England. The cement manufacturers, however, had so come up to the standard that they gave him a better cement than he asked for. There were two points of interest he had noticed. One of these was that in the old days it was always thought when putting in concrete floors an allowance should be made at the edge of the floor for expansion. On account of the improvement in modern cement that necessity was entirely done away with, and now, when they constructed a ferro-concrete floor, they rammed it tight home to the walls on both sides, and in all the floors they had ever constructed of ferro-concrete there had never been the least sign of expansion; as a matter of fact, the concrete shrank and did not expand when setting in air. His second point was that, owing to the extremely fine grinding, the cement deteriorated when kept any length of time. They had noticed in particular where they had had to deal with piles and work of that description, where the punishment was enormous, that piles made of cement two months old were not so good as piles made of cement ten days old. He gave that experience for what it was worth. In numerous buildings they had carried out, they had made tests of the floors and the columns, and at one of these tests at Tottenham, for which Mr. Arthur Dixon was the architect, their chairman that night was present. The result from those tests of fire-proof floors were extraordinary. The deflection was so slight with the enormous loads they were made to carry. Quite recently they put 40 tons on to a 9·9 ferro-concrete column in a building designed by Mr. Pearson, and got a deflection in the beams bearing on the column of 3 millimètres. As he had said, he knew nothing about the scientific part of the matter, but what did occur to him was, how were architects going to design in this material, when the time occupied and the expense came to be considered. The work of designing, drawing, and taking out quantities was enormous: it would mean engaging the services of several trained engineers to work out the complicated figures; all this meant time and money. Consequently, it looked to him as if they would always have to leave the matter in the hands of the specialists. There had been a discussion that night on the question of formulæ. He believed that Mr. Hennebique had never published any formulæ at all, although other persons had published them for him. It was obvious that one formulæ for floors and beams would not get over all the difficulties that arose in general construction. When they came to deal with a building it was not all floors and beams. There might be exceptional difficulties crop up which would require special reinforcement at certain points, and then they would find the ordinary formulæ did not touch it and they would have to go in for experienced specialists. "Experienta docet" should be the motto of all. As he was coming into the room a gentleman raised a question as to whether it was as easy to alter these buildings of ferro-concrete after they were built. It surely was easier to cut steel rods than it was to cut steel girders. The special difficulty of altering ferro-concrete was the hardness of the concrete, but that was only because the concrete in this form of construction was particularly good.

Mr. A. T. Walmisley said the importance of the proper construction of ferro-concrete was great, and he felt they could not be too thankful for the opportunity given them to discuss the two practical papers which had been read. M. Mouchel had brought a complete description of Hennebique's system, and they knew that wherever it had been used it had been most successful. But, of course, there were other systems that architects had to deal with, and amongst these Mr. Marsh had mentioned the Expanded Metal system, which was used in works of construction. The Expanded Metal system could be placed in sheets up to 16 ft. in width, and it had simply to be laid down at a proper level and position and needed no further supervision; whereas, if he had to make a concrete floor with Hennebique's system he would want to see that the rods and saddle pieces and so on were all properly placed, and so there would be a great deal more supervision needed. Although he agreed with the speakers that they could not rely too much upon formulæ, yet they could gain some benefit by the consideration of formulæ applied by the result of experience. It would be a very injudicious thing to place the reinforcement upon the neutral axis of the slab; they wanted to place it where it would take the tension properly. Although they could not rely upon formulæ in their entirety, yet it was well to formulate their experience. If they took a retaining wall or a concrete footpath made of pure concrete they found it would show cracks. He had watched various retaining walls, and had found, as a rule, these cracks would average about 11 ft. apart; so that, if they made a straight joint in a retaining wall of 11 ft. and introduced reinforcement into the concrete, they would have no cracks at all. Then, with regard to piles, for which Hennebique's system was largely employed, it had been found at Southampton that, if they took a rod covered in good concrete and embedded that concrete to the length of eleven diameters of the rod, they could break the rod, when the concrete had set, before they pulled it out of the concrete There was one thing which must be remembered above everything, which was that in reinforced concrete it was absolutely essential to have the best material, both of the aggregate and the cement. He had no fear of corrosion if he eliminated sea-sand and sea-water. They had heard that the action of the iron and concrete were about the same, and that there was no occasion to provide for one expanding and the other contracting. He felt that the subject had elucidated very profitable discussion, and no doubt these papers were simply the prelude to other papers which must come before the Institute later on, when they had further experience upon the subject.

Mr. E. Robins remarked that he had had a long experience of concrete work, and in 1869 he took out the first patent for armoured concrete, which the Americans called skeleton construction. In 1877 he took out a patent for employing it by casting the whole of a house from the middle floor window, and giving the decoration and reverse forms of that decoration which would form different features in each room. That was before anything of the kind was done from concrete in America, and therefore it was an English invention, and he claimed

to be the pioneer of the system. His experience was that Portland cement was not reliable so far as adhesion was concerned, and he had adopted the plan of preparing materials to make it more adhesive. Where he used no heat, he added to the Portland cement about 10 per cent. of whiting and gum dextering. Where heat was employed, he used silicate of soda, and that became petrified by the heat, and it was a hard matter to chip it off. By these means he could use it in the best form for any kind of construction.

Mr. Hilton Nash did not think that M. Mouchel had made the best of his case, for he had not told them the great cost which would be saved by putting up buildings of this construction. Some four years ago a large warehouse was put up partly under his supervision, and in the building, costing 10,000*l.*, he was able to inform his client that by using ferro-concrete he could save 1,000*l.*, and that he felt was a very important item. Another thing they saved in warehouses by the use of the material were ceilings and floors. They had a homogeneous floor of concrete, and when it was finished they had simply to whitewash the under side of the floor. There were drawbacks to the system where they had machinery, because it necessitated providing for the situation of the machinery before the floors were made, so that the holes could be left for the machines. He had very great faith in Mr. Hennebique's system, although he thought that some other systems were equally good. He believed that any one using the system would find it most useful and economical.

Mr. E. W. Hudson asked if there was any possibility of adjourning the discussion. As a member of the R.I.B.A. he was wondering where architects came in at all in the discussion.

Mr. T. L. Banks said he held that all novelty in architecture arose from two causes—either new requirements or the use of materials which the ancients did not use. Lately they had had two new materials—first iron and now concrete. He could not say that the introduction of iron had inproved architecture at all, and he rather thought it was the reverse. In the last few years he had given considerable attention to fire-proofing, and his idea with regard to protecting iron was to separate the protecting shield from the metal. Any covering, such as concrete or terra-cotta, in contact with the metal is necessarily thrown off where the metal expands under heat. What he rose for, however, was to call attention to a material which perhaps cement manufacturers might not like. He read in the paper that the best cement was the slowest setting cement, but, unfortunately, they lived in a "hustling" age, and could not do with slow-setting cement. The strongest cement he knew of, and which he had used for thirty years, was slag from the hematite blast furnaces, not the slag from the lower ores. He had brought with him a portion of a brick made thirty years ago, and he did not think any cement manufacturer could produce anything so hard as that. He built a house which cost 30,000*l.* with nothing but that slag, and it was used very much in the North of England. It would stand fire better than any material he knew, but its drawback was that it set so slowly that he was afraid many men would not have the patience to wait for the setting. It hardly set in a fortnight. He would like to know what effect fire had on the rods in the beams, for they knew the effect it had on girders; secondly, was there any danger of the cracking in large areas of cement roofs and floors simply by the contraction of the cement? and, thirdly, when did cement cease to contract? He had observed cement for twenty years and found it still contracting, and he did not know when it did stop. Fourthly, he would like to know what effect weather had on ferro-concrete-constructed buildings.

Mr. S. Perkins Pick said that he would not have risen had not the question of slag been introduced, but his firm had had very lamentable experiences of the use of slag as an aggregate for concrete. We had some time ago to construct a covered reservoir of over 200 ft. in diameter, and when the cement concrete was made the aggregate was formed of slag from Northamptonshire iron furnaces. It appeared to be quite as hard as an aggregate could reasonably be expected to be, and apparently made excellent concrete, but after the reservoir was filled with water attention was called to certain serious leakages, and upon inspecting the reservoir they found there was a very horrible smell from the outlet which received the under drainage from the reservoir, and which the chemist informed them was sulphuretted hydrogen. The cracks seriously developed, and they tried at first to combat the leakage by putting an enormous iron band round the structure. The effect of that was that the whole of the vaulting sprang upwards, and cracked along the lines of least resistance. They had to take the top off, and then they found that the concrete, which when made appeared to be so good, could be taken in the hand and squeezed through the fingers. The chemist informed them that this was due to chemical action. It was altogether a bad experience for them. With regard to ferro-concrete generally he had had very small experience of it, and had only used it for floors and roofs, and his experience of its use had been quite different from what had been stated. He found without exception that they expanded. He had had cases under his own supervision where walls had been forced out one, two, and three inches, where they had had iron as a tie in the concrete. As an architect, he rather feared a system like that coming into general use, for it appeared to him that the hanging out of great oriel windows, angle turrets, balconies, and so on, without, architecturally speaking, any reasonable support, was destruction to good architecture. Engineers might perhaps be interested in such freaks, but he felt that, as architects, they were going on wrong lines. Of course he spoke absolutely as an architect from the artistic point of view when he said he feared the ferro-concrete coming into general use.

Mr. L. Solomon said they had been shown buildings where the upper walls were 4½ in. or 5 in. thick. He would like to know how they kept the cold out in cold weather and the heat out in hot weather.

The Chairman said he did not know that they could continue the discussion with any further benefit, but they were much obliged to the gentlemen who had come there that night and joined in such an interesting discussion. Unfortunately, he did not hear the papers read, and he was afraid if he had he would have been quite as foggy as Mr. Hannen said he was with regard to the technical part of it.

The discussion then closed.

The Chairman announced that the next meeting would be held on December 19, when papers on "Architecture and Building Acts" would be read by Messrs. Lacy W. Ridge and J. S. Gibson.

THE INSTITUTE OF SANITARY ENGINEERS.

THE annual dinner of the Institute of Sanitary Engineers, Limited, was held on Wednesday at the Holborn Restaurant, W.C., Mr. W. J. Dibdin, F.I.C., presiding, in the unavoidable absence of the President, Mr. W. H. Maxwell, A.M.Inst.C.E. There were also present—Mr. C. Tuff, M.P., Mr. W. Whitaker, B.A., Chairman of the Royal Sanitary Institute, Surgeon-Colonel W. R. Smith, M.D., and Messrs. J. A. Crowther, President-elect, W. Fairley, C.E., J. T. Griffin, Chairman of Council, A. J. Martin, J. C. T. Murray, Dr. Thresh, —Thompson, A. E. Ashby, Secretary, and others.

The loyal toast having been honoured,

Mr. W. Fairley proposed the "Imperial Forces," coupled with the name of Surg.-Colonel W. R. Smith, M.D., V.D., who suitably responded.

The Chairman then proposed the toast of "the Houses of Parliament," coupled with the name of Mr. C. Tuff, M.P.

Mr. Tuff, in reply, said there was room for very great improvement in the ventilation of the House of Commons. If some engineer would contrive some apparatus that would remove the impure air that the members had to breathe over and over again, and could bring in a pure and fresh supply that would not have that soporific effect on some members that the present air had, it would be a very great advantage.

Mr. A. J. Martin then proposed the toast of the evening, the "Institute of Sanitary Engineers." Every one who knew the Institute and the sterling work which it was doing would agree with him that it is an Institute which abundantly deserved to prosper, and he was glad to see signs that it was on the way to prosperity. He saw an earnest of this in the hard-working and capable committee and secretary. An intelligent interest in sanitary matters was by no means widely diffused amongst the public at large. Let them contrast for a moment the absolute apathy with which sanitary questions were regarded, and the interest with which our countrymen were watching the course of the war in the Far East; and yet he doubted whether that campaign was of such importance to the people of this country as the questions with which the Institute had to deal. The sanitary engineer was, in company with others, a soldier who waged a stern and unceasing warfare with disease and dirt. His mission was not to take life but to preserve it, and how well he did his duty would be gathered by a comparison of the death-rate of to-day with the death-rate which prevailed fifty years ago. There was an enemy greater than disease and death which the sanitary engineer had to encounter, and that was ignorance, and in fighting that there was but one weapon to rely on, and that was education. The work of the sanitary engineer and those associated with him was in great measure a work of education. The sanitary engineer had to teach the public and those members of public bodies with whom he came in contact. They had to be taught many things, especially that, of all the duties entrusted to them, there was none so sacred as the care of the public health. They had to be taught also that systems and methods which were the best of their kind thirty years ago were not necessarily the best of their kind now. Most important of all, they had to be taught that in sanitary matters the best was usually the cheapest in the end. But true education began at home, and before the sanitary engineer could educate others he had to educate himself, and that brought him to what he conceived to be the chief function of this Institute. It was pre-eminently an educational body, and he must not forget those kindred institutions which were engaged in similar work. Mr. Martin then referred to the lectures and classes of the Institute, to the meetings for the interchange of opinion, and to the excursions which it makes to interesting and important works, and to the distinguished men who had served the Institute in the past. With the toast he coupled the names of the Chairman and Mr. J. T. Griffin, Chairman of Council.

The Chairman, in responding, referred to the excellent work of their secretary, Mr. Ashby, on behalf of the Institute. During the year 53 new members had been elected to the Institute, namely, 8 Fellows, 43 Associates, and 2 Students. The examinations had been extended by the holding of provincial ones; these also had proved a great success. In connexion with the examinations, and in conjunction with them, a Students' Grade Examination is now being held for those who are between the ages of 18 and 21. This examination is held for students to graduate for the higher examination when they attain the age of entry, namely, 21 years. The students' lectures were again being given during the winter months in practical sanitary science, in preparation for the spring examinations of this and other kindred institutes. The lectures were given by eminent gentlemen in the profession, and the students who attend them showed by the interest they took, and the homework they did, that the lectures prove a beneficial success to them. The technical colleges were now teaching their classes in practical sanitary science on lines similar to the examination syllabus of the Institute, which tended to show that the Institute is doing good work, besides being recognised as one of the leading institutes in sanitary science. At Altrincham the technical college sent nine of their students to the examination of the Institute, held in September at Manchester. District centres have been formed in Exeter and Cardiff this year, and, with the one in Manchester, were doing good work. For the members in the aforesaid districts papers had been read and discussed, and visits to local works of interest had been taken. The local secretaries were to be congratulated on their success. Other district centres would be formed as was found requisite. The Saturday visits that had again been held from the Institute had proved that such visits were required, and that members took an interest in them, for at all the visits that had been held the members had attended in great numbers, and showed that the knowledge to be gained by these visits was worth all the time, and perhaps a little trouble, that had to be given. Very interesting papers had been read to the members on the sessional meeting

evenings, and these had proved successful and interesting by the discussions that followed.

Mr. Griffin, who responded, said that at the last annual dinner a monthly journal, to be issued by the Institute, was talked about, and that matter, he might say, had not by any means been forgotten.

The Chairman then proposed the toast of "The Visitors," coupled with the names of Mr. G. A. Crowther and Mr. W. Whitaker, B.A.

Mr. Crowther, in the course of his reply, referred to the value to those engaged in sanitary works of visits to works and places of interest. He wished he could get members of his Council to visit places where work was going on, for that would help him in his work very materially.

Mr. Whitaker spoke to the same effect as to visits to works, and said that there was only a friendly rivalry between the Institute and the Royal Sanitary Institute. If the Institute of Sanitary Engineers increased and prospered, as he hoped it would, they would do no one any harm.

Dr. Thresh then gave the toast of "The Press," and in doing so said he was not at all certain that the Institute would be well advised in producing a journal as was proposed.

With the toast the names of Mr. C. Ady and Mr. Thompson were coupled, and these gentlemen having responded, the proceedings terminated.

The half-yearly meeting of the Institute was held in the afternoon, in the offices, Bloomsbury-square, W.C., Mr. J. T. Griffin, Chairman of Council, in the chair. The half-yearly report was presented, which showed a membership of 549—a large increase over the preceding year. The report also showed the great help which had been given to those who were desirous of becoming sanitary engineers by the help of the examinations which had been held in the provinces. Mr. J. A. Crowther, engineer, Southampton, was elected President for the ensuing year, and other officers were elected.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring Gardens, S.W., Mr. J. Williams Benn, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Bermondsey Borough Council 16,457*l.* for paving works; and Lewisham Borough Council 6,828*l.* for a similar purpose. Sanction was also given to the following: Hackney Borough Council, sanction to borrow 8,900*l.* for sewer works; Lambeth Borough Council sanction to borrow 3,411*l.* for paving works; Shoreditch Borough Council sanction to borrow 1,255*l.* for street lighting purposes, and Westminster City Council 1,996*l.* for contribution to cost of street improvement.

Lines of Frontage and Projections.—The Building Act Committee recommended that the Council, in the exercise of its powers under section 22 of the London Building Act, 1894, but in no way otherwise than under such section, do consent to the erection of a one-story lavatory addition in front of No. 62, Portland-place, St. Marylebone, to abut upon Weymouth-street, to the line shown on the plan, dated October 1, 1904, submitted with the application of Mr. H. Lake, on behalf of Mr. W. Tebb.

Mr. Lewis moved, and Mr. Spokes seconded, that all words after "that" in the first line should be omitted, and that the following words be added: "Considering it undesirable that an addition should be made to an existing projection beyond the building line, the Council, under the exercise of its powers, do not consent to the erection of any addition."

Messrs. E. White, J. Burns, Howell Williams, and Straus spoke in support of the amendment, which was subsequently carried.

Proposed New Westminster Fire Station.—The Fire Brigade Committee recommended, and it was agreed, that the estimate of 14,360*l.*, submitted by the Finance Committee, in respect of the erection of the new Westminster fire-station be approved, and that expenditure not exceeding that amount be authorised; that of this amount the sum of 13,250*l.* be authorised for the work of erecting the station; that the work be executed by the Council without the intervention of a contractor; and that the drawings, specification, quantities, and the architect's revised estimate be referred to the Works Committee for that purpose.

Standardisation of Rolling Stock, etc.—The Highways Committee recommended, and it was agreed, that the special maintenance estimate of 350*l.*, submitted by the Finance Committee, be approved; that expenditure not exceeding that amount be sanctioned in connection with the standardisation of the rolling stock used for the London County Council Tramways.

Map of London.—On the recommendation of the General Purposes Committee, it was resolved to allocate a sum of 200*l.* for the purpose of preparing a pocket map of London, showing the property under the control of the Council, such as the schools, working-class dwellings, and other buildings.

Vauxhall Bridge.—Mr. Straus, the Chairman of the Bridges Committee, in reply to a question, admitted that the progress of the work on the new Vauxhall Bridge was very slow, but the quality of the work was of the most satisfactory character.

Motor Fire Engines.—The Fire Brigade Committee recommended that tenders be invited for the supply of a motor steam fire engine.

Sir Melvill Beachcroft asked the Chairman of the Committee if he considered that motor-traction was satisfactorily adaptable to fire engines.

Mr. E. Smith said that the motor-engine in the possession of the brigade had been fairly satisfactory, but there were things about them which rendered them less reliable than engines drawn by horses. The committee were watching every invention in that form of traction and its adaptability to fire brigade purposes, and they hoped to make a fuller report in due course. At present, however, they could not entirely rely on motor fire engines.

The recommendation was adopted.

Proposed Legislation.—The Council approved of the form of the London County Council (General Powers) Bill, the Tramways Bill, and the London Port and Docks Commission Bill, which are to be promoted in the ensuing session. In reference to the General Powers Bill the following recommendations were agreed to:—

(*a*) That the resolution of 21st June, 1904, directing that application be made in the next session of Parliament for powers enabling sanitary authorities to require owners to make reasonable provision for the supply of water to the tenants of each floor in tenement houses, be rescinded.

(*b*) That the resolution of 21st June, 1904, directing that application be made in the next session of Parliament for powers enabling sanitary authorities to undertake, if they think fit, the collection and removal of offensive trade refuse; and empowering them to require payment of a reasonable sum by the owner or occupier of any premises from which such refuse is removed, be rescinded.

(*c*) That the London County Council (General Powers) Bill be approved; that the seal of the Council be affixed to a petition for leave to bring in the Bill; and that the Bill and petition be deposited pursuant to the standing orders of Parliament, and with such necessary alterations (if any) in the Bill as the Parliamentary Committee may consider desirable.

Proposed County Hall.—Mr. John Piggott, in accordance with notice, moved that, having regard to the fact that the Council's present rental in respect of the inadequate and disconnected chief offices, comprising over twenty-five separate blocks of buildings, amounts to over 34,000*l.*, and also having regard to the increasing extra expense, loss of time, and inconvenience caused by the departments of the Council's service being so far removed from each other, and to the pressing need for adequate office accommodation for the staff, it be referred to the Establishment Committee to consider and report, as quickly as possible, upon sites available for a county hall and offices, and that the Committee do submit a definite recommendation for the acquisition of the site which, in their opinion, is most suitable for the Council's purposes.

Mr. Edward White seconded the motion, which was carried without any discussion, and the Council adjourned.

PANAMA ARMS AND FLAG.—It is reported in the *Bulletin Commercial*, of Brussels, that the Government of Panama have opened an international competition for designs suitable for the arms, also for the flag, of the Republic. Details of colour and designs are left to the discretion of the competitors. A prize of 200 gold piastres (about 40*l.*) will be awarded for each of the designs adopted. Competing designs will be received at the office of the Secretary for Public Works, Panama, until the first meeting of the National Assembly in 1906.

Illustrations.

THE BOURSE, PARIS: AS RECENTLY ADDED TO.

THE Paris Bourse, commenced in 1808 from the design of Brongniart and completed in 1827 by Labarre, had been long insufficient for its modern uses. Its enlargement was decided on in 1900, commenced, under the superintendence of M. Cavel, in February 1902, and completed in December 1903, when the new buildings were formally opened. Twenty-two months therefore sufficed to carry out this important work, without any interruption of the daily business of the Bourse.

The original building had no basement or cellarage, but was merely erected on the surface of the ground. A large subterranean story has now been carried out, including galleries for the passage of vehicles, and for the services of lighting, heating, ventilation, electricity, lifts, etc., a kitchen to furnish the luncheon-room, a printing-press, and various other accessory departments.

In regard to the architectural aspect, M. Cavel rightly judged that in adding to such a piece of purely symmetrical columnar architecture, the only course was to continue the order of columns and the whole architectural *ordonnance* round the new wings, so as to break up as little as possible the homogeneous character of the design; and in this he has been very successful.

In a building of this classic style, with a wide central area, the lighting of the new basements was of course a considerable difficulty, which has been solved by the employment of floors and partitions formed of the Luxfer Prism Company's prismatic glazing, which affords floors that transmit light without being practically transparent. The two interior views show the ground floor of one of the new wings, entirely floored with Luxfer prismatic slabs lighting the basement below. The other interior shows a portion of the basement with the corridors, all lighted by this means.

The estimated cost of the new buildings was 4 million francs, but it actually amounted to 6 millions. However, it is a thoroughly good piece of work, architecturally and structurally.

SHIPTON COURT, OXON.

THE drawings represent some of the interiors in an early XVIIth century house, originally known as "Shipton-under-Wychwood," as remodelled from the designs and under the superintendence of Messrs. Perkin & Bulmer, of Leeds.

The drawing was exhibited at the last Royal Academy.

CHURCH OF ST. CHRISTOPHER, HASLEMERE.

THE new church of St. Christopher, at Haslemere, is a chapel of ease to the parish church. It is designed to seat 200 worshippers, exclusive of the choir and clergy, and with a view to a possible enlargement in the future by the addition of an aisle on the north side. There is a room over the vestries for various parochial uses.

The church is built of Bargate stone (the local rag stone), with dressings of Weldon stone, and is seated with chairs. The font is made of Ancaster weather bed, and the pulpit of oak on a stone base.

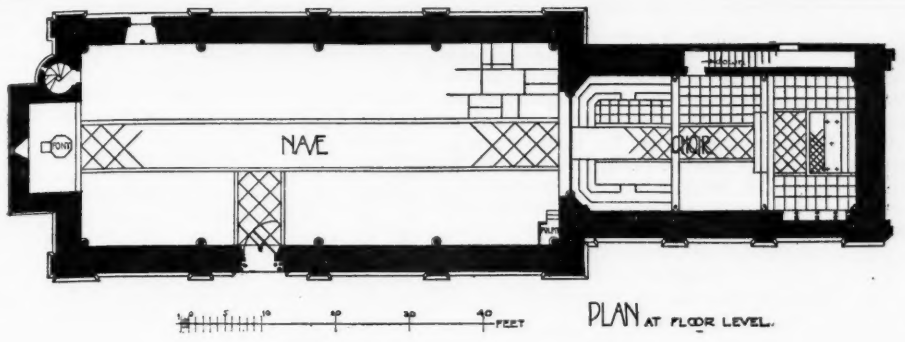
The lectern, of wrought-iron and leather, is by Mr. W. Bainbridge-Reynolds, and so is the whole of the wrought-iron work in strap hinges and handles and the tower cross; the latter is gilded.

The figure of St. Christopher in the niche by the west door is in cast lead, and is the work of Mrs. M. D. Spooner.

The church was built by the Haslemere Builders, Limited. Messrs. Spooner & Cobbold are the architects.

MEMORIAL CHURCH, MALVERN LINK.

THE church here illustrated, which was erected as a memorial to Archdeacon Livingstone, and is dedicated in honour of Our Saviour's Ascension, consists of a nave and choir. There are no aisles, and the vestries are below the choir, advantage being taken of the natural fall of the ground. At the west end is the baptistry, and above that the organ is placed. The nave is spanned by



Memorial Church, Malvern Link.

transverse stone groins, between which is a plaster barrel vault. The choir, three bays in length, is vaulted with stone transverse and diagonal ribs, with plaster filling. An arcaded clearstory runs the entire length of the church. Coupled lancet windows light the nave, the choir having single lancets. At the entrance to the choir is placed a wrought-iron hammered screen, partially gilt, and above this, at the springing of the choir arch, is the rood, of oak, stained and gilded. At the east end of the choir is a triplet lancet window, containing the subject of the Ascension, the treatment being that of single figures on grisaille work. Below is a painted triptych in red and gold, the centre panel of which contains a picture of the Virgin and Child, with attendant Saints in the surrounding panels. The triptych stands on a stone base, bearing the inscription, "*O oriens splendor lucis æternæ veni et illumina*," and a carved rose and rays in the centre, brought out by means of gold and colour. The festal frontal is of silk damask, with panels of the three archangels, Gabriel, Raphael, and Uriel, worked in silk on a gold ground, alternating with panels of gold arabesques. The font is of Irish grey marble, eight-sided, with detached shafts. A metal cover hangs from the vaulted ceiling, of copper, parcel gilt. Over the baptistry arch stands the figure of S. Michael. At the western face of the tower, externally, is a carved representation of the Ascension, with the inscription, "*Ascendisti in altum cepisti captivitatem.*" The choir stalls, pulpit, lectern, and other fittings are of oak. The floors of the choir and baptistry are of black and white marble. The walls externally are plastered with a fair quantity of Guiting stone used for the dressings. Internally the latter are of Farleigh Down. The roofs are covered with stone slates. Adjacent to the church at its eastern end is the parish room.

Mr. W. J. Tapper, of London, was the architect, and the builders were Messrs. Stephens, Bastow, & Co., of Bristol.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses :—

Norwood.—(*a*) That the resolution of September 1, consenting to the erection of buildings on a piece of land on the east side of Poplar-walk and the south side of Ferndene-road, Herne Hill, be rescinded; (*b*) that the Council do not consent to the erection of buildings on a piece of land on the east side of Poplar-walk and the south side of Ferndene-road, Herne Hill, to abut also upon proposed new streets (Messrs. R. Ellis & Son for Mr. R. A. Sanders).—Agreed.

Lines of Frontage and Projections.

Hackney, South.—Additions to a building at No. 17, Sutton-place, Hackney, to abut upon Urswick-road (Mr. J. Hamilton for Mr. T. C. Wootton and Messrs. Barlow & Son).—Consent.

Haggerston.—That the application of Mr. G. H. Lovegrove for an extension of the periods within which the erection of a building upon the site of Nos. 225 and 227, Hackney-road, Haggerston, was required to be commenced and completed be granted.—Consent.

Kennington.—That the application of Mr. F. Hingston for an extension of the period within which the erection of bay-windows and a porch to No. 52, Priory-road, South Lambeth, was required to be commenced be granted.—Consent.

Norwood.—Six houses on a site abutting upon the southern side of Park-road and western side of Clive-road, Norwood (Mr. P. Stock for Mr. G. R. Freeman).—Consent.

St. George, Hanover-square.—A projecting porch at No. 6, Upper Brook-street, Grosvenor-square, St. George, Hanover-square (Mr. R. Armstrong for Mrs. Seymour).—Consent.

Battersea.—That the application of Mr. M. Fitzmaurice for an extension of the periods within which the erection of a pumping station on a site abutting upon the east side of York-road and the north side of Creek-street, Battersea, was required to be commenced and completed be granted.—Consent.

Wandsworth.†—A one-story building upon part of the forecourt of the premises of Messrs. Pickfords, Ltd., on the southern side of Grove-road, Balham (Mr. J. E. Beaumont for Messrs. Pickfords, Ltd.).—Refused.

Width of Way.

Bow and Bromley.—Buildings upon a site abutting upon the eastern side of High-street and southern side of Ammiel-terrace, Bromley, with external walls at less than the prescribed distance from the centre of the roadway of Ammiel-terrace (Mr. H. Heckford for the Council of the Metropolitan Borough of Poplar).—Consent.

Lewisham.†—School buildings on the eastern side of Kelvin-grove, Sydenham Hill-road, Lewisham, with a forecourt fence at less than the prescribed distance from the centre of the roadway of the street (Mr. T. J. Bailey for the Education Committee of the Council).—Consent.

Formation of Streets, etc.

Lewisham.—That the application of Mr. H. Porter for an extension of the period within which the roadway of a new street to lead from Woolstone-road to Cranston-road, Lewisham, was required to be clearly defined throughout by posts and rails or so otherwise as the Council might permit and thrown open to the public as a highway, be granted.—Consent.

Hackney, Central.—That an order be issued to Mr. C. Winkley refusing to sanction the formation or laying out of a street for foot traffic only to lead out of the western side of Priory-place, Well-street, Hackney, the widening of a portion of Priory-place and the erection of buildings.—Agreed.

Space at Rear.

Lewisham.—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a building on the south side of Dunoon-road, Forest Hill, with an irregular open space at the rear (Mr. H. L. Upham for Mr. C. Walker).—Consent.

Lines of Frontage, Projections, and Deviation from Certified Plans.

Strand.—A building upon the site of Nos. 36 and 36A, St. James'-street, and No. 64, Jermyn-street, St. James', Westminster (Mr. W. Woodward for Mr. L. Thomas).—Consent.

The recommendations marked † are contrary to the views of the local authority.

APPOINTMENT.—The Shoreditch Borough Council, at their meeting on Tuesday last, appointed Mr. A. G. Cross, F.S.I., and member of the Quantity Surveyors' Association, of Old Queen-street, Westminster, their quantity surveyor in connexion with the rebuilding of the town hall, a portion of which was destroyed by fire in August last.

TASMANIAN WAR MEMORIAL.—A bronze statue representing a soldier in the field has just been shipped to Hobart for erection in the public park in memory of the colonists who served in the South African war. The statue is the work of Mr. Benjamin Sheppard, of Chelsea.

ARCHITECTURAL SOCIETIES.

THE LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—At the rooms of this Society, on Thursday the 1st inst., Mr. Alexander McGibbon, of Glasgow, read a paper on "Byzantine Architecture." The justification for this subject, he said, was found in the current popularity of the style, notably in the new Westminster Cathedral and some of the paper designs for the Liverpool Cathedral, and a large number of students' competitions, and as a suggested counteraction to *L'Art Nouveau*, whose vogue can only be explained as a protest against the restraints of orthodox architecture. Designing architecture in "styles," as commonly understood, was defended by the lecturer. Byzantine architecture was described as Romanesque, modified in its principal features, and it has been defined as mediæval Greek. Whatever the first intention, in effect the style was one of interiors principally; for, as with many of the Italian Romanesque Churches, the exteriors were bald, but the idea seems to have been marble veneer. Rustication was not employed, but the traditional Romanesque use of tiles brought about the first appearance of polychromatic architecture. The constructive methods were ingenious, but not perhaps, for modern builders, very instructive. An interesting point was that truth in architecture was much more in evidence then than with Gothic or Renaissance builders, for semi-circular vaults were not sheltered under a wooden roof, and there was no false dome. When height was wanted, the later usage was to elevate the dome on a drum, but still the form that was seen internally was that of the exterior. The absence of mouldings was noticeable, but suggestive to present-day designers. Of their mosaics little need be said, and they were of glass rather than marble or encaustic tesseræ. The carvings in capitals were very characteristic, largely influenced by drill work, and the decorative effect realised in flat surface treatment was more like painting or inlay than carving of the bossy sort we are accustomed to. The ornament was taken from metal work, but the transference to another material was not allowed to influence the form. A number of lantern slides, illustrating the various points of the lecture, were shown on the screen.

ARCHITECTURAL SECTION OF THE GLASGOW PHILOSOPHICAL SOCIETY.—At a meeting of the Architectural Section of the Royal Philosophical Society of Glasgow, held on the 28th ult., Mr. Neil M'Whannell, the President, in the chair, Mr. Samuel Smith, clerk of works at the new Technical College Buildings, read a paper on the "Decay of Stone in Buildings." After introducing the subject, Mr. Smith said that decay in buildings, in a great many cases, might be attributed to the cementing materials of the stones being of clay, on which the action of frost has a disintegrating effect. The stones, which showed no signs of decay on examination, would be found to be covered with a hard skin which protected them from atmospheric action. In every stone when it was newly quarried there was a certain amount of moisture or natural sap. In many cases, where the binding material had been of a felspathic nature, this moisture had in solution a quantity of one of the alkaline silicates. As the sap dried out the soluble silicate came to the surface of the stone, when by the action of the carbonic acid in the atmosphere it was decomposed, and a coating of insoluble silica was deposited on the surface of the stone. This coating protected the stone from atmospheric action, thereby preventing decay. It did not always follow that a stone which showed good weathering qualities when built in the district in which it had been quarried would possess the same good qualities in every district. Cleopatra's Needle stood the Egyptian atmosphere for 2,000 years, but commenced to decay immediately after its erection in London, and there were similar results with stone built in Glasgow. In the author's opinion, the chief cause of decay in Glasgow was the amount of sulphur acids in the atmosphere. These acids attacked very readily stones of which the binding material was the carbonate of lime or magnesia. A practical proof of this was to be seen, until the erection of a verandah a few days ago, at the exit from the Central Low Level Station, on the west side of Hope-street, the masonry above the doorway all showing signs of decaying very badly; while on the other parts of the building there was very little if any decay. Passing on to discuss the question

as to what stones were the most suitable to use for buildings in Glasgow, he said that in a sulphur-laden atmosphere the stone with the smallest percentage of carbonates had been found to be the least liable to decay, provided that the physical properties of the stone used were in proper order. These conditions were best met by the red sandstone from that part of Dumfriesshire which lies between Thornhill on the north and Dumfries on the south, and includes Gatelowbridge, Closeburn, Corncockle, and Locharbriggs Quarries. On some of the older buildings in Glasgow the signs of decay were not so marked as in new buildings. At the time these buildings were erected the city of Glasgow covered a very small area, compared with what it did now, and the sulphur acids would be very quickly diffused among the purer air of the surrounding country districts. The stone with which some of the older houses were built was taken from local quarries, and on analysis had been found to contain less carbonates than the majority of the white stones in use at the present time. The paper was brought to a close by some remarks on the nature and application of various preservatives. —Mr. James Stark said that Mr. Smith had brought forward many reasons unsettling his belief that carbonic acid, dissolving the carbonates, especially of lime, was the cause of the decay of buildings in Glasgow. He would not like, however, to offer a decided opinion on the subject.—Mr. David Chalmers said that they were all agreed that both the old red sandstone and the carboniferous rocks readily decayed, especially those of the quarries round Glasgow. But the question was where were they to find a substitute? He did not think it was in the red rocks of Dumfriesshire, as some of the buildings erected with stones from these quarries already showed considerable signs of decay.—Dr. R. M. Buchanan did not agree with the theory propounded. In the first place, he said there was difficulty in realising how these sandstone rocks were originally disintegrated without a change of a bio-chemical character. This raised a doubt in his mind as to the feasibility of the view that free carbonic acid was the agent in the disintegration of stone in buildings in Glasgow. If sulphuric acid was the agent, why was not the whole surface not washed by rain decayed? The localisation of the decay suggested that they had to deal with a process not purely owing to atmospheric conditions, but to a process under the control of vital agencies. His view was that decay was primarily due to living organisms in the stone. These living organisms broke down the stone, liberating sulphates, which readily combined with the sulphuric acid in the atmosphere, and which were then built up again. He admitted, however, that without carbonate in excess the process of decay would not go on.

SHEFFIELD SOCIETY OF ARCHITECTS.—A meeting of this Society was held recently in the Society's room, Leopold-street, when Mr. J. R. Wigfull lectured on "The Lancet Period of English Architecture." He urged the necessity of studying the history of a country side by side with its architecture. In illustration of this he pointed out that in the middle of the XIIth century what is now France was divided up into a number of separate provinces, about half of which were under the government or indirect control of the King of England. To say, therefore, that Gothic architecture was the invention of the French was misleading if one regarded France in its modern aspect of one country and one people. By the help of plans of various cathedrals the lecturer showed that, although starting from one point, the architects of England and France worked on more or less independent lines, and by the commencement of the XIIIth century each evolved a distinct type, as shown in the contemporary cathedrals of Amiens and Salisbury. He pointed out that the plans of our English cathedrals were largely influenced by the monastic desire for a large presbytery, while the great cathedrals of Central France, intended more for general worship, were quite different in arrangement. The lecturer then dealt with the introduction of the pointed arch, showing that the difficulty of vaulting oblong and irregular spaces with the round arch led to the use of the pointed form, one which, while more readily adapted to varying spans, had the advantage of being better constructionally. The general design of various features of the buildings of the period was described and illustrated by slides from photographs and measured drawings made by the lecturer, who laid stress on the desirability of studying a portion of a building, such as a bay or the end of a nave, choir, or transept, as a whole, and not merely a small feature separated from its surroundings in the way common amongst many students. On the motion of Mr. C. Pawson, seconded by Mr. F. H. Wrench, and supported by Messrs. H. L. Paterson, E. M. Gibbs, and W. G. Buck, a hearty vote of thanks was accorded to Mr. Wigfull for his lecture, which was illustrated by lantern slides, exhibited by Mr. J. Atkinson, of University College.

ENGINEERING SOCIETIES.

THE JUNIOR INSTITUTION OF ENGINEERS.—There was an exceptionally large attendance at the meeting of this Institution held at the Westminster Palace Hotel on the 3rd inst., the Chairman, Mr. Samuel Cutler, jun., presiding, when a paper entitled "Some Points of Interest on Torpedo Boat Construction" was read by Mr. H. E. Yarrow, Stud.Inst.C.E., of Poplar. Commencing with considerations with respect to the hull, the author showed the importance of realising in the design the maximum strength with the minimum weight, uniform elasticity throughout its length being essential. Any sudden change of section in these lightly constructed vessels formed a source of great danger, and it was quite possible, by adding material, to reduce the actual strength. It was of great importance to minimise vibration as much as possible, and the author illustrated by means of lantern slides the effect of a properly balanced engine on the stability of the boat itself. With the use of high pressure steam the paper showed how imperative it was to specially consider the best practice relating to steam pipes, those of small diameter being recommended for various reasons, amongst them being superheating of the steam and ensuring that each boiler was developing approximately its proper proportion of the power required. Referring to steam turbines, the author held that, although they possessed many advantages over reciprocating engines, they could not be regarded as economical for varying speeds as in torpedo boats. He alluded favourably to the explosive type of engine, which was developing so rapidly at the present time.

COMPETITIONS.

Y.M.C.A. PREMISES, PAISLEY.—The Building Committee of the Paisley Young Men's Christian Association have now accepted the plans for the new buildings to be erected by them at High-street and New-street. In connexion with the buildings, several local architects had sent in competitive plans, which were submitted to Mr. H. E. Clifford, architect, Glasgow, as adjudicator. Mr. Clifford awarded first position to the plans of Mr. T. G. Abercrombie, architect, Paisley, whose designs the Building Committee have now adopted. Mr. Abercrombie's plans show a four-story building in High-street, consisting of shops, offices, and rooms, with main entrance to the institute, and there is also a building to the rear with frontage in New-street. In the latter building there is to be a hall capable of accommodating 500, and the classrooms, clubrooms, janitor's house, etc., will also be in the rear premises. The buildings, including site, are estimated to cost between 10,000*l.* and 12,000*l.*

BOOKS RECEIVED.

PAPERS OF THE BRITISH SCHOOL AT ROME, Vol. II. By T. Ashby, jun., F.S.A. (Macmillan & Co., 30s.)

ENGLISH METAL WORK: Ninety-three drawings. By W. Twopeny (1797-1873), with a preface by Laurence Binyon (Archibald Constable & Co., 15s.)

THE TABERNACLE: ITS HISTORY AND STRUCTURE. By the Rev. W. Shaw Caldecott (The Religious Tract Society, 5s.)

ARBITRATIONS. By Banister Fletcher, F.R.I.B.A. Third edition. (B. T. Batsford, 5s. 6d.)

THE CONDUCT OF BUILDING WORK. By J. Leaning, F.S.I. Second edition. (B. T. Batsford, 2s. 6d.)

THEATRE, CARDIFF.—A new theatre is to be erected in Park-place, Cardiff, from plans prepared by Messrs. Ernest Runtz & Ford, London. The new theatre will be constructed of red brick, with terra-cotta mouldings. The auditorium will accommodate about 2,000 persons. The stage will be 70 ft. wide by 45 ft. deep, and there will be twenty dressing-rooms.

Correspondence.

THE JOINERY TRADE.

SIR,—Your correspondent, "A London Builder," complains that he cannot produce doors, sashes, frames, etc., at prices that will compete with those of foreign manufacture. A great deal depends on the quantity he puts in hand. Of course, he could not make two or three of each at prices anything like what he could buy foreign. But if he cannot produce joinery in quantities of, say, 200 or 300 at a cost considerably less, and of much better quality than anything that comes from abroad, there must be something wrong with his management. A short time ago we required a quantity of 2-in. doors of a certain size. Being rather slack, we decided to make them, and the result was that we were able to produce for 18s. 2d. what would have cost us 22s. 6d. had we bought foreign. I could name several large works in London where joinery such as he mentions is made to such profit that the proprietors are laying down special plant for this purpose. I agree with him that the local rates and the requirements of the Factory Act form a severe handicap to the London manufacturer, but I fail to see how the tax he proposes would help him, most of the imported joinery being made cheaply at the large converting mills in timber-producing countries. The manufacturer who sends the joinery your correspondent complains of likewise sends the timber which constitutes our raw stuff, so, if we put a tax on manufacturing goods, it simply follows that the manufacturer will raise the price of his raw stuff against us, which would mean a raising of prices all round to benefit nobody. The organisation of business which allows of no waste either of time or materials and the cutting of all unnecessary expenses are the principal factors in getting work out cheaply.

A SHOP FOREMAN.

FIRE-RESISTING FLOORS.

SIR,—Adverting to Mr. E. O. Sachs' letter in your issue of the 3rd inst., the words he used when writing on the lessons of the Baltimore fire were:—"The necessity of prohibiting the use of terra-cotta hollow floors with thin webs in such classes of buildings, *unless the superimposed concrete filling is self-supporting, and the terra-cotta lintels used merely to take the place of centering.*"

Mr. Fawcett anticipated all this nearly seventeen years ago by his patent of February 25, 1888, and we have made this form of floor ever since. We do not see why we should not call attention to the fact by advertisement, if we think proper to do so.

BRETT A. ELPHICKE
(for Mark Fawcett & Co.).

PROPOSED NEW POLICE AND FIRE STATIONS, BRISTOL.

SIR,—As most of your readers are aware, in this competition no professional assessor is to be appointed, and both the Institute Committee and Competition Reform Society have issued notices to their respective members that, for that and other reasons, the conditions are unsatisfactory.

I should like to supplement this by stating that the Council of the Bristol Society of Architects, has, through the President and Hon. Secretary, addressed a circular letter to each member of the Watch Committee pointing out (1) that in the very large majority of architectural competitions promoted by public bodies, such a professional assessor is engaged, and, consequently, the confidence of intending competitiors is secured; (2) that a very large proportion of architects have, for a considerable time past, engaged to abstain from all public competitions in which no assessor is appointed, and that numbered amongst their ranks are nearly all the well-known architects of eminence in various branches of their profession; it is evident, therefore, that the designs submitted will not be likely to be of a high order if the majority of the best men are excluded; (3) in the recent competition for the Bristol Central Library a professional assessor was appointed, and that we believed that the principle of appointing an assessor had been adopted by the Bristol Corporation for all succeeding competitions, and it is a source of much disappointment to us that, in this instance, the principle for which the architectural profession contends so strongly has been departed from.

It was also added that architects outside the district should have confidence that no local bias has in any way affected the decision, and that this confidence was obtained by the appointment of an independent professional assessor.

An examination of the site plan issued will

show that no details of the existing police courts are given; these were recently added to by a local architect, and there would have been no difficulty in obtaining information so essential to competitors, the absense of which must place them at a great disadvantage.

We think, sir, that these facts will be sufficient to show that all self-respecting architects will be wise loyally to conform to the request of the R.I.B.A. not to enter a competition of so unsatisfactory a character.

GEORGE H. OATLEY, President.
H. DARE BRYAN, Hon. Sec.
Bristol Society of Architects.
Fine Arts Academy, Bristol.

A MYSTERIOUS COMPETITION.

SIR,—It would be interesting to know if any of your readers have news of a mysterious competition, the drawings for which were sent in nearly six months ago. It was for alterations to the Shire Hall, Bury St. Edmunds, and the County Surveyor, Mr. Ainsworth Hunt, was to be the assessor. One guinea was paid for the particulars. No information is forthcoming as to what has been done except that Mr. Hunt has been ill. If this illness has lasted six months, is it not about time that the Council appointed another assessor? Such proceedings are hardly courteous to the competitors.

I would suggest that the competitors should take some strong and joint action in this matter. I enclose my card. MYSTIFIED.

The Student's Column.

ASPHALT: ITS COMPOSITION AND PROPERTIES.—I.

THE use of asphaltic materials for a variety of architectural and engineering purposes is increasing year by year, and it is to give some account of the origin, preparation, composition, and characteristic properties of the various forms that this short series of articles is written. The mode of application of asphalt to roadways, and of bitumen for securing watertight qualities, has received attention in engineering circles and been recorded in the technical press, and this aspect will therefore not be dealt with except so far as is necessary to explain the distinctive properties of the several substances. It will, however, be seen, as the subject unfolds, that the lessons of practical work are of the first importance, and that, valuable as is the information furnished by mechanical or other tests, they must be associated with experience of the same material under working conditions. As, however, the sources of supply of asphaltic materials are continually enlarging, and include not only new specimens of natural products, but also of artificial imitations, it becomes necessary to have aids in discriminating their worth.

To be able to do this, it is necessary to describe the behaviour of materials of proved value for the purpose in question, to describe the various adulterants or inferior substances that are likely to be met with, and give, as far as present-day information will allow, the means of separation and estimation of the desirable constituents.

The two distinctive qualities of asphaltic materials are (*a*) elasticity and (*b*) imperviousness to moisture, and they are in direct antithesis to the qualities of concrete. The two materials are correlative; they have their separate functions, which when applied each in its proper place may combine to produce the most useful effect.

The difference in elasticity is made use of in the construction of foundations to steam hammers, engines, heavy machinery, etc., where vibration has to be absorbed. This may be accomplished by building (*a*) layers of good concrete, alternating with sheets of bitumen, (*b*) building in bituminous concrete, (*c*) filling into a steel framework compressed asphalt rock powder. On the other hand, the elastic nature of asphalt, which keeps it from cracking even under considerable changes of temperature, requires that it shall be supported by an unyielding foundation such as is secured by good Portland cement concrete; and it is upon this fact that success in asphalt pavements and in watertight layers largely depends. Wherever a pressure of water has to be resisted, that must be opposed by concrete or other equivalent, the accommodation to changes of shape and the prevention of percolation being supplied by the asphalt.

The "accommodation" of asphalt is the reason of its long life under heavy street traffic, it having been found that compressed asphalt is always more dense in the upper layers than the lower, even when the thickness has been reduced by wear to only ½ in. thick. The surface which receives the shock of the vehicular traffic, therefore, always rests on a cushion, and is elastic to the tread of animals.

Asphalt paving was first introduced in Paris in 1838, and its use has now become so extended as to require annually 600,000 tons of the natural rock, in addition to the substitutes made in Europe and America. The experience gained in the early years of the industry have been set forth in the volume published in 1886 by M. Leon Malo, and in the papers read by Mr. W. H. Delano before the Institution of Civil Engineers (see vols. 43, 60, and 152 of their Proceedings), and this information forms the groundwork of our knowledge of the utility of the natural materials.

As applied to roadways and footpaths, these materials fall into two classes:—(*a*) Compressed asphalt powder, (*b*) asphalt mastic.

The first is the natural asphalt rock ground to fine powder, and must be of such composition as will agglutinate its particles under the pressure and heat of the hot iron tools used for ramming. It is essentially a base of pure limestone impregnated with a minimum of 10 per cent. of bitumen.

The second is the same material as the first, but to which a quantity of bitumen has been added to make it liquefy at a moderate temperature, and enable it to be floated and worked under trowels.

It is convenient in studying natural rock asphalt clearly to comprehend that it is dependent upon two leading factors, the first of which is occasionally sandstone but generally limestone in a pure and finely divided state, and the second of which is "bitumen," a term used to express those organic substances which give it the distinctive properties of agglutination, elasticity, etc., and which are found to be soluble in bi-sulphide of carbon. Ideal asphalt for a compressed roadway is composed of pure limestone uniformly impregnated with 9 to 10 per cent. of bitumen, non-evaporative at a temperature of 428° Fahr. Bitumen, as shown by Boussingault, is composed of carbon 85 parts, hydrogen 12 parts, and oxygen 3 parts by weight, corresponding approximately and empirically to the formula $C_{38}\ H_{64}\ O$. It is found almost pure in various places, as will subsequently be described, but "pure bitumen" is not the constituent which is exclusively desired in the mixture known as natural asphalt.

What is required is a mixture of substances of the bitumen class such as shall give a suitable melting point, with an absence of brittleness, and shall do this without deterioration under the changes of atmospheric temperature and exposure that will come upon it.

These bitumen-like constituents extend on the one hand towards the nature of petroleum and on the other towards pure bitumen, which has its natural prototypes in the manjak of Barbados and in the veins of New Brunswick and Bentheim in Hanover. The oil-like components tend to decrease the melting point, but if present in excess cause creeping under changes of atmosphere and abrasion of wheel traffic, whilst the "pure bitumen" tends to brittleness and to a considerable increase in the melting point. It is upon the respective proportions of the intermediate components, and their total percentage in the asphalt rock, that its behaviour depends. These facts have been slowly evolved by repeated investigations by chemists in Europe and America, made for the purpose of learning the synthesis of the natural material and how it might be artificially reproduced; but the first researches were made by a means which stated the result as bitumen without any fractionation—viz., by extraction with carbon bi-sulphide. For the manufacture of asphalt mastic, bitumen must be added to the natural rock after grinding, and for this purpose "Trinidad Lake asphalt" is found to be the best, because of its composition, which corresponds more or less completely with the mixture of bitumens in the European rock asphalt.

There are, however, on the Island of Trinidad every shade and variety of asphalt, from petroleum to manjak, and it is that found in La Brea (the Spanish term for Pitch Lake) that is found to be the most satisfactory for blending. How far this is a pure mixture of bitumen will be seen from the analyses to be given later.

WESTMINSTER CITY COUNCIL.

THE usual fortnightly meeting of this Council was held at the City Hall, Charing Cross-road, on Thursday last week.

Workmen's Hours of Labour.—The General Purposes Committee, having again considered this question, recommended that the existing hours of labour of employees in both the Works and Highways Departments be not altered, and that the City of Westminster Municipal Labour Union (who petitioned the Council for a revision) should be informed accordingly. This was agreed to.

Haymarket Electric Railway Station.—The Works Committee reported that they understood from the plans of the proposed alterations in the lifts at this station that passengers would alight from the four exit lifts only 6 ft. from the old street line in Jermyn-street. The footways of that thoroughfare were narrow, and as it appeared to the Committee that there was a likelihood of serious inconvenience being caused to pedestrians, they had drawn the attention of the London County Council to the matter.

Metropolitan Paving Committee.—On the recommendation of the Committee Alderman Emden was reappointed the Council's representative on this Committee for the ensuing year.

Piccadilly Widening.—After a long discussion on a further report of the Improvements Committee on this matter it was agreed to inform the London County Council that the City Council was prepared to contribute an amount equal to one-seventh of the total cost, the recommendation of the Committee that no increase should be made in the contribution being lost.

District Surveyors and Plans of Drainage Work.—The Public Health Committee reported having received a letter from the London County Council, dated November 18, in reply to the City Council's letter of July 15 last, suggesting that district surveyors, in all cases in which plans of new buildings submitted to them include proposed work which is subject to the supervision of the sanitary authority, should call the attention of the persons submitting such plans to the fact. The County Council stated that in March, 1899, copies of a notice drawing the attention of builders and others to the fact that the district surveyors had no control over matters relating to the sanitary arrangement of buildings, in respect of which the approval of the local authority was necessary, were sent by the County Council to district surveyors for exhibition in their district offices; that they did not feel that they could require district surveyors to undertake the duty of specially examining plans with a view to ascertaining whether or not notice was required to be given to the sanitary authority; but that, with a view, however, to meeting as far as possible, the wishes of the City Council, they had given instructions for further copies of the notice above referred to to be sent to each district surveyor.

OFFICIAL ENGINEERS AND SURVEYORS AND ARCHITECTURAL WORKS.

THE Royal Institute of British Architects have sent the following memorial to various public bodies:—

"That whereas the employment by county or municipal authorities of their officials to execute works of architectural importance is a matter involving grave interests of an artistic, practical, and financial nature, it is for the general welfare of the community that such employment should be regulated by certain conditions.

The Royal Institute of British Architects and the Allied Architectural Societies respectfully beg leave to point out:—

(1) That when the official is an engineer or surveyor, the artistic aspect of buildings designed by him is apt to be overlooked or misunderstood by reason of his not having received the artistic training of an architect.

(2) That the engineer or surveyor in planning and arranging buildings is fettered by the lack of expert knowledge possessed by architects.

(3) That greater expense is incurred by employing an engineer or surveyor than by employing an architect. Non-expert planning entails unscientific distribution, and consequent expense in construction, often leading to subsequent alterations which involve waste of public money, the amount of which is impossible to be ascertained owing to the complicated nature of official departments. The saving of an architect's fees is undoubtedly false economy. It is the function of an architect to obtain for his client the best value for money expended, which special experience, not possessed by an engineer or surveyor,

alone enables him to do; further, his independent position compels him to exercise a closer control over expenditure than the salaried official, whose purely personal interests are not intimately involved.

(4) That the time of a county or municipal official is so greatly occupied with administrative work that it is impossible for him, when entrusted with any building scheme of first-class importance, to devote the requisite attention to the essential considerations of artistic design, expert planning, and economic building. Such work is inevitably referred to irresponsible assistants, and an unsatisfactory and expensive building is the result.

The Royal Institute of British Architects and the Allied Architectural Societies therefore respectfully and earnestly urge upon county and municipal authorities:—

(1) That architectural work be not placed in the hands of engineers or surveyors.

(2) That where it is deemed desirable for architectural work to be carried out by a county or municipal official, such official shall be required to have passed the qualifying examinations of the Royal Institute of British Architects.

(3) That the work of an official architect be restricted to structures of secondary importance, and that all buildings of a monumental character be entrusted to independent architects to be selected in such a way as may seem best to the local authority."

COURT OF COMMON COUNCIL.

THE Lord Mayor presided over a meeting of the Court of Common Council at the Guildhall, on Thursday last week.

The Proposed Embankment Tramways.—Alderman Sir Charles Bell presented a petition from the president and court of governors of Sion College against the proposal for a tramway along the Victoria Embankment. The petition was referred to the Streets Committee.

Memorial from the R.I.B.A.—A memorial from the Royal Institute of British Architects and the allied architectural societies in favour of the employment by county and municipal authorities of architects in the planning and arranging of buildings was referred to the General Purposes Committee.

The City Engineer.—On the recommendation of the Officers' and Clerks' Committee it was agreed that Mr. D. J. Ross, the Engineer to the Public Health Department, should retire (on account of ill-health), and that a retiring allowance of 550*l.* per annum should be made to him during the pleasure of the Court. A lengthy discussion on the duties of the engineer and surveyor ensued, the Committee having come to the conclusion that these should be separate offices. Ultimately the matter was referred to the Streets and the Improvements and Finance Committee.

OBITUARY.

MR. FERGUSON.—We much regret to announce the death, on December 1, at his residence, Caldew Lodge, Carlisle, of Mr. Charles John Ferguson, F.S.A., in his sixty-fifth year. Mr. Ferguson, who practised as an architect and surveyor at No. 50, English-street, Carlisle, and in Kensington, S.W., was, with his brother, the late Richard Saul Ferguson, M.A., F.S.A., Chancellor of the Diocese, a son of the late Joseph Ferguson, M.P. for Carlisle in 1852-7. He was a county magistrate for the Cumberland Ward. On leaving Shrewsbury School Mr. Ferguson was articled to the late Mr. Cory, of Carlisle, with whom he afterwards entered into partnership under the style of Cory & Ferguson, having, in the meantime, been employed in the offices of Sir George Gilbert Scott. He was elected an Associate of the Royal Institute of British Architects in 1864. Of Mr. Ferguson's principal architectural works we have published illustrations of the following:—Naworth Castle, additions and alterations for Mr. George Howard, M.P., comprising the Stanley Tower, external courtyard, kitchen offices with bedrooms above, two new staircases, and refitting of the library and music and billiard rooms (March 10, 1883, and September 19, 1885); the extensive additions, at a cost of some 20,000*l.*, to Tullie House, Carlisle (1685), purchased by the Corporation in 1890 for its adaptation for purposes of a school of science and art, public library, and fine art gallery and museum (May 9, 1891; and January 20, 1894, Castle-street entrance); Seascale Church, Cumberland (January 16, 1892); Badsworth Grange, Yorks, for the Misses Heywood-Jones, of Badsworth Hall (June 8, 1895); Clive Church, near Grinshill quarries, Shropshire, general restoration, with new chancel and oak screens, vestries, tower, and spire (July 3, 1897, with two views of the interior as restored and refitted, and March 5, 1904, perspective view); and his drawn plan of Lanercost Priory, Cumberland, which formed the basis of one made by Mr. E. Ridsdale Tate (October 1, 1898—No. XXVII. of our "Abbeys of Great Britain" series). Amongst his other more important works, we should mention the extensive alterations and improvements he carried out for Lord Armstrong at Bamborough Castle, of which he exhibited a notable model in the Royal Academy rooms, and which we fully described and illustrated with a plan in our issue of May 30, 1896; Edenhall; and Muncaster Castle. Mr. Ferguson prepared the plans and designs for the enlargement of Milton Hall, Cumberland (1886-7); the smoking-room at Dovenby Hall; the new wing and additional story, Town Hall, Carlisle (1887); the repair and restoration of Morland Church, Westmorland, with new vestry, stalls, and roof; the column for the memorial to the late J. R. Creighton, erected at the south end of Eden Bridge, Carlisle, in 1898; the restoration of St. Mary's Church, Gosforth; the mission-room, Newtown, Carlisle; Garden House, Fairlawn, Kent; St. Aidan's Church, Warwick-road, Carlisle, with parish rooms and parsonage; the enlargement of "Tyneholme," Howard-place, Carlisle, for Mr. F. Robinson (1899); the rebuilding of the central block, University College, Aberystwyth, after the fire in 1885, for the science "side," with laboratories, lecture-rooms, etc., and the official rooms of the college; the new church, Savile Town, Birtley, near Dewsbury, of which the first portion, for 500 sittings, was completed in July, 1900; and Stone Church. Amongst Mr. Ferguson's earliest works are Holy Trinity Church, Bournemouth, cruciform on plan with an apsidal chancel, designed after the Lombardic manner, in 1869; and, with his partner, the two wings of the Cumberland Infirmary, Carlisle. In conjunction with his brother, he was the author of a historical and architectural account of Lanercost Priory, of which fabric he restored the nave and the buildings on the west side some years ago. Mr. Ferguson contributed many papers upon kindred topics to the Translations of the Cumberland and Westmorland Archæological and Antiquarian Society.

MR. F. W. BEDFORD.—We regret exceedingly to have to announce the death, at the early age of thirty-seven, of Mr. F. W. Bedford, an architect whose name is well known to our readers, and whose buildings have often been illustrated in our pages. Mr. Bedford was the head of the firm of Bedford & Kitson, of Leeds, but about a year ago removed to London, though the firm still retained their offices at Leeds. Mr. Bedford was a son of the late Mr. James Bedford, manufacturing chemist, of Leeds, and was articled to Mr. William Thorp, of that city, and, upon the expiration of his indenture, he entered the offices of Messrs. Ernest George and Peto, of London. He subsequently won the Owen Jones scholarship at the Institute of Architects. He started in practice in Leeds in 1892. His early work included *two houses in the old gardens, Headingley, Leeds; *two houses, Shireoak-road, Leeds; *another house, Shireoak-road, Leeds; *alterations to Meyland House, Leeds; *gymnasium at St. Peter's School, York; *Dalguire, Harrogate; *Brahan, Perth (a large house for Mr. R. D. Pullar); *Westwood Croft, Leeds. In 1897 he took Mr. Kitson into partnership. Their formal partnership ceased last year, when he migrated to London, although they continued to act in conjunction in certain work. Other buildings that he carried out were: House in North Hill-road, Headingley; *alterations, reseating, and decoration of St. James' Church, Leeds; branch banks for the Yorkshire Banking Company, Ltd., at *Thirsk, *Ripon, Middlesbro', *Hunslet, and *York; the *Leeds Overseers' offices (alterations and additions); *St. Aidan's Vicarage, Leeds; *All Hallows Vicarage, Leeds; additions to Shadwell Grange, near Leeds; *Red Court, Scarborough; Free Library, Police Station, and Fire Station in Dewsbury-road, for the Leeds Corporation; the Leeds School of Art; the Leeds Public Dispensary; Red House, Chapel Allerton, Leeds; Webton Court, Chapel Allerton, Leeds; Pen-y-Bryn, Chapel Allerton, Leeds; "Aros," Chapel Allerton, Leeds; business premises, Willington-street, Leeds (alterations and decorations). Since going to London he won the second premium in the Newcastle Grammar School competition, and he designed a new organ case for Headingley Hill Chapel (in this year's R.A.), and he was engaged in other work at the time of his death.

*The asterisks denote those which have been illustrated in our pages.

DR. DRESSER.—We regret to hear of the death, at Mulhouse, Germany, on the 24th ult., of Dr. Christopher Dresser, of Elm Bank, Barnes, London. Dr. Dresser had long been well known as a decorative designer, and worked largely in producing designs for textiles for manufacturing firms. Christopher Dresser was born in Glasgow on July 4, 1834, of Yorkshire parents. His parents remained but a short time in Scotland, and, after a few moves, spent some years in Bandon, Co. Cork, and here he received all the little school teaching he ever had. When about thirteen years of age they all moved to London, and he was placed at the old School of Design at Somerset House. At fifteen he gained his first scholarship, and from that time made rapid progress in drawing. He then took to drawing to illustrate botanical works, and taking a great liking for flowers he gave his attention to the study of Nature, and became Lecturer on Botany in the Department of Science and Art, and also in the London and St. Mary's Hospital schools. He wrote about this time (1860) several works on botany, including "Unity in Variety," "The Rudiments of Botany," etc. He issued his first work on art in 1862, the "Art of Decorative Design," and in that year made his first intimate acquaintance with Japanese Art through the exhibits shown in the exhibition by Sir Rutherford Alcock. Many of these he made drawings of, and at the end of the exhibition bought some of these specimens, and thus commenced the collection of art objects which has ever since been his pride. By the time of the Paris Exhibition, in 1867, he had become well known to the manufacturers of this country, and many of the wall papers, carpets, and textile fabrics shown there bore designs from his pencil. In 1873 he spent some time in Vienna, and wrote for the Press many articles on Art from that city. In 1876 he started on his journey to Japan, travelling *viâ* America, and visiting the Philadelphia Exhibition on his way. He delivered a few lectures on Art while in the States. His travels in the land of the Rising Sun, and his keen appreciation of Japanese Art and interest in the people are told in his book, written soon after his return home, "Japan, its Architecture, Art, and Art Manufacturers." In 1878 he spent much time in Paris, being one of the jurors in the Exhibition. Of late years he had devoted most of his time to preparing designs for manufacturers, and in the enjoyment of his garden and flowers. His works on Art, besides those already mentioned, include "Studies in Design," and the "Principles of Decorative Art," and "Modern Ornamentation." He wrote for various Art journals, and lectured on Art in many towns in this country. He was for many years a Fellow of the Linnean Society of London, and of the Edinburgh Botanical Society, and was granted the degree of Ph.D. by the University of Jena for his discoveries in connexion with natural science. He was a most genial companion and interesting talker, and never tired of discussion on Art and the habits of the nations of the East, trying to trace their histories by their ornamental forms as a philologist does by their language. His daughter, Miss Ada Dresser, who had assisted her father for many years, has retained his staff of assistants, and intends to carry on his work.

GENERAL BUILDING NEWS.

NEW TOWER, ROCHESTER CATHEDRAL.—The tower of Rochester Cathedral, which has been rebuilt, with the addition of a spire, at an outlay of upwards of 5,000*l.*, was recently dedicated. The new central tower and spire have been designed as far as possible on the lines of the original work of Hamo de Hythe. This bishop raised the tower by the addition of a belfry story, and capped it with a low spire of oak, covered with lead. This tower was almost rebuilt in the XVIIth century. In 1826-7 it was said to be in a dangerous condition, and was taken down by Mr. Cottingham, at that time architect to the Dean and Chapter, who replaced the old spire by a square tower with corner pinnacles. The tower is stonework, and the spire is of wood, covered with lead. On the upper part, over the belfry windows, are four small niches containing figures of the Virgin Mary on the east side, Bishop Hamo de Hythe on the north, St. Andrew, the patron saint of the cathedral, on the west, and St. Paulinus on the south. On the face of the parapet above the figures is a cornice ornamented with carved foliage, and above the parapet are twelve shields, three on each face, bearing on the east side the coats of arms of the present bishop and the late dean; on the north side the arms of Bishop Hamo de Hythe and of Mr. T. H. Foord, the builders of the old and

new towers respectively; on the west side the arms of the City of Rochester, of the Cathedral, and the County of Kent; and on the South side the Royal Arms and the arms of Canterbury. A new clock and chimes have been added, while the peal of bells has been increased from six to eight, four of the old bells having been recast. The architect is Mr. C. Hodson Fowler, of Durham, and the contractor, Mr. S. F. Halliday, of Stamford.

CHURCH EXTENSION, CHARWELTON, NORTHAMPTONSHIRE.—The work in connexion with the enlargement and restoration of Charwelton Church, has been completed, and the building was reopened by the Bishop of Peterborough on the 16th ult. The alterations include an extension of the chancel eastwards, a new roof, built to much the same pitch as the other part, a new east window, etc. The interior has been panelled with oak to a height of 10 ft., and the vestry has been turned into an organ chamber. The tombs and brasses in the chancel have also been attended to. The contractor for the extension of the chancel was Mr. John Bosworth, and Mr. Archer, of Northampton, did the panelling. The south doors of the chancel, which are of teak, were the work of Mr. Franklin, of Heledon. Mr. Cecil Fabian, sculptor, of London, carved the angels and the emblem of the Holy Trinity on the exterior of the chancel, and the architect was Mr. Christopher Carter, of London. The cost has been about 1,600*l.*

GERMAN CHURCH, BROMPTON-ROAD, LONDON.—Count Bernstorff, German Minister in London, attended at the consecration, on the 27th ult., of a new German Evangelical church in Montpelier-place, Brompton-road. The pulpit was made and carved in Berlin. The coloured windows were the work of the glass painter to the Bavarian Court. Some of the windows came from Cologne. The electric light fittings were by Messrs. Drake, an English firm. Upon Mr. Charles G. F. Rees, the architect, the Emperor has bestowed the insignia of the Fourth Class of the Imperial Order of the Red Eagle.

WESLEYAN CHURCH, BUSHEY.—The foundation-stones were laid a short time ago of the new Wesleyan church, which is now in course of erection at New Bushey. The new building faces London and King Edward roads, and is being built by Mr. Charles Brightman, from plans prepared by Messrs. Bell, Withers, & Meredith. The structure is to accommodate 750 persons, and its erection involves an expenditure of 6,768*l.*

CHURCH RESTORATION, LYNG, SOMERSET.—The reopening of the Lyng parish church, which has recently been restored, took place on the 22nd ult. The restoration has been carried out by Mr. H. J. Spiller, of Taunton, under the supervision of Messrs. Samson & Cottam, architects, of Taunton, at a cost of more than 600*l.* While the restoration was in progress an ancient rood loft was discovered on the north side of the church, and a piscina in the opposite wall, near the pulpit.

CHURCH, LEMINGTON, NORTHUMBERLAND.—A new Methodist New Connexion church has been erected in Union Hall-road, Lemington, by Mr. Thirlwell, of Benwell, and Mr. Jackson, of Gosforth, from designs prepared by Mr. B. R. Irvin, architect, Gateshead. Accommodation is provided for some 350 people.

WESLEYAN CHAPEL, SEDGLEY.—The work in connexion with the reconstruction of the Wesleyan chapel at Sedgley has been completed, and the new building was recently opened. The premises now consist of a chapel, with stained-glass windows, a schoolroom, three classrooms, and a minister's vestry. The building work has been carried out by Mr. Tomkinson, Wolverhampton, to the plans prepared by Mr. J. Ashley Bailey, Sedgley. The total cost of the scheme amounts to 1,620*l.*

WESLEYAN CHAPEL, UPPER TOOTING.—The new Wesleyan chapel on the High-road, Upper Tooting, was recently opened. The site was secured at a cost of 3,000*l.*, and the building itself represents an expenditure of 11,675*l.* The builders were Messrs. Johnson & Son, of Wandsworth Common, who carried out the work from the plans of Mr. James Gibson, architect.

BAPTIST CHAPEL, HADDENHAM, CAMBRIDGESHIRE.—The memorial-stones were laid recently of the new Baptist chapel at Haddenham. The site is on the north side of the village green, and the buildings are to include a church to seat 337 adults, or a mixed congregation of 450 persons, and vestries, cloakrooms, etc. The buildings will be in the late Gothic style, and the walls are to be faced with red bricks, and Bath stone will be used for the spire and for the dressings to the doors, windows, etc. Provision will be made for the choir and organ in the south transept, and a small gallery at the front end. The baptistry will be of marble, and will be placed in front of the rostrum. The two vestries, with the usual conveniences, will be at the rear. Arrangements are to be made for heating by hot-water low-pressure system. The architects are Messrs. John Wills & Sons, of Derby and London, and the contract for the work has been placed with Mr. H. Feast, of Haddenham. The cost of the building, exclusive of the land and architects' fees, is estimated at 2,300*l.*, and the total outlay involved is put down at 3,200*l.*

A ROWTON HOUSE FOR NEWCASTLE-ON-TYNE.—The prospectus of the Northern Rowton Houses, Ltd., was issued on the 21st ult. The company has been formed for the immediate purpose of acquiring a site in Newcastle, and erecting thereon a building to be used for the housing of the working classes, and also to acquire other sites for a similar purpose in Newcastle and the northern counties, such establishments being similar to those known as "Rowton Houses." In the first place, it is intended to erect a house capable of accommodating 250 men on the Dog Bank, at the foot of Pilgrim-street, according to plans prepared by Mr. J. C. Maxwell, architect, which have already been passed by the Town Improvement Committee. The site of the proposed building has a frontage of 162 ft. to the Dog Bank and 49 ft. to Pilgrim-street, and contains an area of 1,000 sq. yds. It will contain a separate residence for the superintendent and an office; entrance hall, with shop for the sale of goods to the lodgers; dining-room, recreation-room, reading-room, smoking-room, kitchen, and 250 cubicles, lodgers' scullery, lockers, baths, foot-washing troughs, lavatories, wash-house, and other conveniences, with separate accommodation for the caretakers and bedmakers. The premises will be lighted throughout by means of electric light, and be heated by means of a low-pressure hot-water system. There will also be a disinfecting chamber. The charge for each lodger will be 6d. per day.

CLUB, BOSCOMBE, BOURNEMOUTH.—The new men's club in connexion with the parish of St. John's was opened recently. The new club premises are situated in the Shelley-road, and consist of a recreation-room (which portion was formerly used as the St. John's Mission Hall), a reading-room, a billiard-room, a refreshment buffet, and bathrooms. The recreation and reading rooms are separated by a folding screen, and when thrown into one form a hall which will be available for use as a mission hall on Sunday evenings. The recreation-room is 49 ft. in length by 20 ft. in width, whilst the dimensions of the reading-room are 26 ft. by 19 ft. The billiard-room, which is beyond the reading-room, is 28 ft. in length by 19 ft. in width. In the basement, lavatory and bath accommodation has been provided. Mr. Charles T. Miles, was the architect, and Councillor George Mitchell the builder.

BRADFORD TECHNICAL COLLEGE EXTENSION.—The sanction of the Board of Education to the proposed extension of the Bradford Municipal Technical College has been received by the clerk to the Bradford Education Committee. A report upon the proposed extension was submitted to the City Council at their October meeting. This report, which was drawn up by Professor Barker and Mr. Whitehead, was supplemented by an estimate of the cost of the extensions, prepared by Mr. F. E. P. Edwards, the City Architect. The estimate of the cost, as prepared by Mr. Edwards, makes an allowance of 28,078*l.* for buildings, 24,102*l.* of which is for the main block, the remainder being for the spinning and weaving sheds. Machinery and fittings are expected to absorb 10,000*l.*, the land required for the textile school (5,092 super. yds., at about 12s. 6d.), 3,182*l.* 10s., and the land for a future extension or resale (7,169 super. yds., at about 8s. 3d.), 2,948*l.* A sum of 791*l.* 10s. is allowed for contingencies.

PUBLIC LIBRARY, PAISLEY.—A new wing of the Free Public Library and Museum, Paisley, has just been opened. The addition has been built to the east of the main building, and is in the same style. From the vestibule on the right is the indicator-room, from which there is an entrance to the new reading-room. The rooms are lighted from the roof. In the upper chambers of the building there is a reading-room for ladies and also a boys' reading-room. The building throughout is heated with a system of radiators and fitted with the electric light. Messrs. Honeyman, Keppie, & M'Intosh, Glasgow, were the architects.

PUBLIC HALL, CROFT, LEICESTERSHIRE.—On the 30th ult. the Hon. Philip Stanhope, M.P., opened a new public hall and club at Croft. The building consists of a hall, measuring 33 ft. by 22 ft., exclusive of the recesses, which consist of a platform, 16 ft. by 8 ft., an ingle nook fitted with seats on each side of the open fire, and a gallery over. Retiring-rooms are provided on each side of the platform, communicating with it and with the hall, and in the foundation space is a billiard-room. The base of the building has been constructed of local granite. The superstructure is built of local made bricks, partly finished with selected red bricks, but in the main coated with rough-cast composed of cement and granite clippings. The verandah is supported on oak posts and timbers, and the roofs are covered with hand-made red tiles from Staffordshire. The building was erected by the staff of the Croft Granite, Brick, and Concrete Co., under the direction of Mr. C. H. Robottom, the manager, from the design of Messrs. Barry Parker & Raymond Unwin, architects.

MISSION ROOM, TWICKENHAM.—The new mission room, in Milford-road, St. Margaret's, was recently dedicated by the Bishop of Kensington. The building, designed by Mr. J. S. Alder, London, provides accommodation for 360 persons. The scheme, when completed, provides for a number of club and class rooms, with a gymnasium, but for the present only the hall, with two small rooms, and lavatory, and storeroom for seats have been built. The total cost has been a little over 2,000*l.*

INEBRIATES' HOME, HAIRMYRES, LANARKSHIRE.—An inebriates' home, erected by the Lanark County Council, at Hairmyres, was opened on the 1st inst. The building has been constructed from the design of Mr. Paterson, architect, Hamilton, and provides accommodation for ten patients. The home is built on the cottage system, and in addition to the quarters for the patients there is a section for the administrative part of the institution. Accommodation is provided for the nurses in the home, which contains fourteen bedrooms, this arrangement allowing a separate bedroom for each patient.

PRESBYTERIAN HALL AT FOREST HALL, NORTHUMBERLAND.—The foundation-stones of a Presbyterian hall has just been laid at Forest Hall. Mr. Walton Taylor, of Newcastle, is the architect. The new hall (including platform) is 52 ft. by 28 ft. 6 in., and the principal entrance is from the main road. On each side of the entrance corridor there are cloak-rooms provided for each sex, and a ladies' room on the first floor occupies the whole frontage. At the opposite end of the hall is a raised platform, so arranged that it can be divided into two classrooms by means of movable partitions. In addition there is an infants' room and a kitchen vestry. The new minister's vestry, which has a separate entrance giving access to new hall and church, is a continuation of the new buildings, and faces the main road. The new premises are to be built of stone. The contract has been let to Mr. John Craven, builder, of Newcastle.

ISOLATION HOSPITAL, WALTON.—The new fever hospital, which has been erected at Walton, was opened a short time ago. The buildings consist of an administrative block, which contains living accommodation for the nurses to be employed at the hospital. The block called Ward Block A contains two wards of four beds each. They are heated by a central stove, and each has a lavatory and sink accommodation at the end. The wards will accommodate four males and four females respectively, and this block is intended for scarlet fever patients. Ward Block B contains two wards, each with two beds, and fitted with kitchen and other accommodation. This block will be used for typhoid and diphtheria patients. The outbuildings comprise a mortuary, ambulance shed, laundry, and ironing and furnishing room for linen. The buildings are of brick, with overhanging roofs of brindled Ruabon tiles. Half-timbered work is introduced in the design, and the site is bounded with a rustic fence of oak. The floors of the wards are of maple, secret nailed, and wax polished. The whole scheme has been designed and carried out by Mr. F. E. Dixon, Engineer to the Walton-le-Dale Urban Council. The contractor for the work was Mr. M. Shorrock, and the sub-contractors were Mr. Richard Bashall, Messrs. Tullis, Mr. Robert Hull, Mr. Breakell, Messrs. W. Cook & Sons, and Messrs. Sanderson & Southworth.

BAKERY, NORWICH.—A new steam bakery has been erected in West End-street, Heigham, for Mr. F. H. Bassingthwaight. The premises consist of a red brick building, 51 ft. in length, and two stories high. The upper floor will be used as a flour store, and the lower floor is divided into three portions—the bakery, the breadroom, and the loading-room. The bakery is 36 ft. by 23 ft. The walls are faced with white enamelled bricks, and the floors throughout the building are laid in mosaic. The whole will be lighted by electricity. Messrs. Morgan & Buckingham

were the architects; Mr. W. J. Hannent, the builder; and Messrs. A. Pank & Sons, plumbers.

BREWERY, DUBLIN.—A new brewery has been erected in Dublin for Messrs. Guinness & Son. The building occupies a rectangular plot of ground of 2,830 sq. yds., with a frontage of 150 ft. to Robert-street and Grand Canal-place respectively, the pile rising to a height of 130 ft. above the street level, and containing nine floors, ranging from 10 ft. to 19 ft. The structure has been built on cement concrete foundations, varying in depth from 14 ft. to 17 ft., upon which have been erected stanchions of rolled steel. These in turn support rolled-steel girders, fixed horizontally, the whole forming the framework for the floors and walls. The walls are of bricks of an average thickness of 2½ ft., and the dressings are of white enamelled bricks. The floors are of concrete. The outer faces of the walls are broken at intervals with a base 12½ ft. high and strings and cornices of chiselled and moulded granite from the Ballyknocken Quarries. The roof is composed of wrought-steel principals, supporting timber purlins and boarding, Mellowes' patent glazing, and slates capped with sheet lead. The building contractors were Messrs. M'Laughlin & Harvey, Ltd., Dublin, and their manager, Mr. Anthony Campbell, organised and superintended the work. The steel-construction work was carried out by Sir W. Arrol; Messrs. Ross & Walpole were the contractors for the steel roof work; Mr. Wm. Osborne supplied the granite work; and Messrs. Oates & Green were the manufacturers of the white enamelled bricks. The design of the building and the supervision of its erection were under the control of the engineer-in-chief, Mr. A. H. Hignett, and his staff. Mr. Arthur Dudgeon, Dublin, was the surveyor and measurer of the works.

PROPOSED EXTENSION OF CO-OPERATIVE COMPANY'S PREMISES, ABERDEEN.—A deputation from the directors of the Northern Co-operative Company, Aberdeen, accompanied by Mr. Geo. Watt, architect, attended a recent meeting of the Plans Committee of the Aberdeen Town Council for the purpose of laying before the meeting plans of a reconstruction of the premises of the company in Loch-street. It is practically proposed to rebuild the entire elevation facing Loch-street and to make it a height of four stories instead of three as at present. The probable cost of the rebuilding will be about 6,000*l.*

COTTAGE HOMES, DOWNEND, GLOUCESTER.—The new Cottage Homes at Downend, which were opened on the 24th ult. by the President of the Local Government Board, have been provided by the Bristol Board of Guardians at a cost of about 20,000*l.* The site comprises 20 acres, 12 acres of which are fenced off and retained for agricultural and market garden purposes. The group of buildings comprises a lodge entrance, seven blocks of fourteen semi-detached houses, a convalescent home, and a small hall for general, including school, purposes. Each of the houses contains a hall, a dayroom, 17 ft. by 15 ft., a kitchen of like dimensions, scullery, larder, usual domestic offices, and officers' sitting-room. On the upper floor are two bedrooms for children, measuring 17 ft. by 15 ft., with observation window to officers' room, an isolation-room, 12 ft. by 10 ft., bathroom, lavatory, and officers' bedroom. The convalescent home contains on the ground floor two dayrooms, 25 ft. by 17 ft., one of these being for boys and the other for girls; a dining-room of the same size, cloakroom, kitchen, larder, scullery, and an officers' sitting-room. On the first floor there are on the boys' side three bedrooms, 17 ft. by 15 ft., bathroom, lavatory, etc. The accommodation on the female side is similar, and the two departments are separated by a house-parent's bedroom. There are three bedrooms on the upper floor, together with store rooms and other conveniences. The hall is 50 ft. by 30 ft., and in front of the building is a large piece of grass ground available for games. The homes will provide accommodation for 168 children. The buildings have been erected by Messrs. Geo. Downs & Sons, from the designs of Messrs. La Trobe & Weston.

ALMSHOUSES, BRADFORD.—A commencement has been made with the preliminary work in connexion with the new almshouses, which are to be erected at Daisy Hill. The site lies on either side of Daisy Hill-lane, the principal portion—some 18 acres—being between the top of Hazelhurst-road and the Daisy Hill reservoir. Close by is a smaller plot—about 8 acres. The larger plot is to be the site of the new test workhouse. Its construction is not, however, to be immediately undertaken. On the smaller plot the Guardians are about to erect sixty-six cottages for the accommodation of the aged and deserving poor. The cottages will be built in blocks so arranged that each looks out on an expanse of grass plot set with trees. With each block will be a recreation-room or sewing-room, and a common kitchen. An administrative block, with accommodation for a caretaker and his wife will be provided as an adjunct of the kitchen. Each cottage will be a single-roomed dwelling devised to hold two persons. They will be built of brick, covered with rough-cast, with stone dressings, and roofed with Yorkshire stone slates. There will be a bath-house for each block. The plans and designs for this scheme, which have been prepared by Messrs. Empsall & Clarkson, architects, of Bradford, have just been approved by the Local Government Board, and the first part, consisting of twenty-eight cottages, will be put in hand without delay.

ENLARGEMENT OF THE CATTLE MARKET, YORK.—On the 22nd ult. the extensions, which have been made to the York Cattle Market, were opened by the Lord Mayor. A large area has been added to the covered market, and two new auction rings and offices have been added, with a façade to Paragon-street. These include additional settling-rooms and offices for the auctioneers conducting the sales, lavatories, and other accommodation. Between the two rings is a glazed verandah for the accommodation of those attending the sales. The auction rings are fitted with domed roofs. In the well is an iron pen in which the animals will be shown, and round this is a passage-way, from which rise tiers of seats with an auctioneer's rostrum facing the cattle entrance. The two rings are connected by an alley-way to enable buyers and dealers to obtain easy access from one ring to another. The total area of the market now affords accommodation for 7,680 cattle, 9,465 sheep, and 300 pigs. The improvements have been carried out from the plans of Mr. E. Creer, the City Engineer.

SANITARY AND ENGINEERING NEWS.

WHARF, PORTISHEAD, BRISTOL.—The new timber wharf at Portishead was recently opened. The structure is 600 ft. long, and the bottom of the dock has been dredged to allow a vessel drawing 22 ft. of water to be berthed alongside. For the construction of the wharf, timber piles, upwards of 50 ft. in length, were driven into the ground, and they were then braced and fastened together. To fix the bracing it was necessary to construct a watertight dam enclosing the whole wharf. The ground at the back of the wharf has been levelled up so as to form a stacking area. It has been provided with a system of railway sidings connected with the Great Western Railway Company's line, and terminating in a gridiron, 450 ft. long, consisting of eight sets of railway lines. To effect the junction with the Great Western Railway it was necessary to build a small bridge over the Portbury Stream Diversion. The steel girders and flooring of this bridge rest on foundations carried on timber piles. Two open sheds covering an area of 1,800 sq. yds. have been erected close to the railway sidings with a covered way between them. To facilitate the handling of timber three steam cranes with specially-designed curved jibs to reach over high stacks of timber have been provided. On the wharf there are two steam travelling cranes with elevated bases and long jibs. A jetty, 200 ft. long, with berths on both sides, has been provided for the accommodation of barges, and a crane, lifting 6 tons, has been erected at the end to deal with log timber. The stacking ground is furnished with a system of fire hydrants connected to the water company's main, and hose-boxes with standpipes and nozzles are fitted at convenient places. The contractors for the main work were Messrs. Joseph T. Firbank, Ltd., of London. The cranes were supplied by Messrs. Stothert & Pitt, Ltd., of Bath, and the open sheds were erected by Messrs. J. Lysaght, Ltd., of Bristol. Mr. W. W. Squire is the docks engineer, and the cost of the undertaking has amounted to 30,000*l.*

WATERWORKS, SKIPTON.—A commencement has been made with the laying of the pipe track which is the initial step in Skipton's new scheme of water supply sanctioned by the Skipton Water and Improvement Act of this year. A 12-in. main, which is to be permanent, is now being laid to the site of the intended reservoir at the foot of Emsay Moor. It will then be taken outside the top water line of the intended reservoir to the stream known as Moor Beck, where a weir will be made. This weir, which will be about 730 ft. above sea level, will be so constructed that it will pass the compensation water required by Act of Parliament, the surplus water being taken through the main to the town. To ensure the best water being supplied, the Whitfield Springs, which in themselves yield 150,000 gallons per day, will be conducted to the weir. The Embsay Moor reservoir, which is two miles one furlong from the centre of Skipton, will have one embankment right across the valley in a line indicated by the trial shafts that have been sunk. The capacity of the reservoir will be 120,000,000 gallons, and the surface level of the water when the reservoir is full will be 700 ft. above sea level. The drainage area is 700 acres. The total estimated cost of the new scheme is about 70,000*l.*, and Messrs. G. H. Hill & Son, Manchester, are the engineers, assisted by Mr. J. Mallinson, Engineer and Surveyor to the Skipton Urban Council, who has charge of the preliminary work of laying the permanent pipe track that is expected to be available for water supply augmentation purposes by next spring.

PROPOSED ESPLANADE, KIRKCALDY.—Messrs. Sang & Lockhart, C.E., Kirkcaldy, have submitted a report to the Kirkcaldy Town Council on the proposal to form an esplanade from the harbour to Rose-street, a distance of 1,995 ft. They detailed several schemes, in each of which a concrete wall the whole length of the esplanade would be necessary. The top of the wall would be on the same level as the proposed new pier, with a parapet 3 ft. high. Inside the wall would be a heavy concrete footway 50 ft. wide, sloping towards the wall, and at the inside of the footway one or two steps leading down to a macadamised roadway 60 ft. wide, and on the inner side of this roadway, along the new building line, a concrete footway from 10 ft. to 15 ft. wide would be formed. Opposite the Port Brae a cart road 12 ft. wide would lead down to the beach, with two stairways along the wall at distances of 170 yds. The plans showed a complete scheme at an estimated cost, including engineering and inspection, of 16,800*l.* Another scheme, costing about 14,000*l.*, would be to form a concrete footpath 20 ft. wide along the wall, and, at a suitable distance from the new building line, to form a roadway 28 ft. wide, and the space between the roadway and footway could be levelled up with ashes to form a promenade.

SEWAGE DISPOSAL SCHEME, CARLISLE.—Mr. Sandford Fawcett, M.Inst.C.E., on behalf of the Local Government Board, held an inquiry at Carlisle, on the 30th ult., respecting the application of the Carlisle Corporation for power to borrow 65,000*l.* for a sewage disposal scheme for the city. Mr. H. C. Marks, the Carlisle Surveyor, who is engineer for the sewage disposal scheme, produced plans and explained the scheme in detail. They had had, he said, an experimental bacteriological scheme dealing with part of the city sewage for several years, and so satisfactory was its operation that the City Council decided upon the extension of the scheme now before the inspector. Mr. George Chatterton, engineer, of Westminster, also gave evidence in support. Professor Dibden, analytical chemist, described the effluent after it had gone through the bacteriological process at present in use as almost as clear as ordinary river water. There could be no fear of pollution. Mr. Joseph Graham, engineer, Carlisle, said he agreed with the continuous system being adopted for Carlisle, but thought the land for the works ought to have been on the Etterby side of the river.

PIER IN THE ISLAND OF MULL.—A new pier is being erected at Salen, Mull, from the design of Mr. James Deas, C.E., Glasgow. It consists of a sub-structure of concrete carrying a pierhead of open timber work, approached by a wooden gangway, the whole estimated to cost slightly over 5,000*l.* The contractors are Messrs. George Halliday, Ltd., Rothesay.

MISCELLANEOUS.

BROOKS'S PARABOLA CURVE.—This instrument, which the rules of grammar suggest should be described as a "parabolic" curve, is a piece of transparent celluloid sheet cut in the form of a parabolic segment, and intended to be used in the same manner as a set-square. Its convenience is increased by the inscription of a line representing the *axis*, and of a second line serving to locate the *focus* of the parabola. In drawing diagrams the instrument can be employed for delineating curves to represent all parabolas, if suitable vertical scales be adopted—a course that will often save much time, as it is far more easy to construct an additional scale than a new parabola. In connexion with the study of mathematics, the curve should be appreciated by teachers and students alike, for by its aid a true parabolic curve can be

drawn in a few moments. It is only necessary to rule a straight line for the axis, and upon this to mark a point to represent the focus. The celluloid curve is then placed in position with its inscribed axis and focus upon those previously marked on the paper, when the curve can be instantly drawn. By marking the distance of the focus on the other side of the *vertex* of the parabola, the *directrix* can be ruled with equal facility by the aid of the straight-edge at the base of the instrument. An additional advantage is that the curve is proportioned for use on squared paper, the unit adopted being 1 in. The employment of such an appliance has been suggested by writers on mathematical subjects, but we believe the patentee of this curve deserves the credit of being the first to produce an instrument of the kind in a commercial form.

WIRE-WOUND WOODEN PIPE.—According to a report furnished by the United States Consul at Vancouver, a Canadian company has installed a plant there for the manufacture of wire-wound wooden pipes, for which several orders have already been executed and others are on hand. It is claimed that this pipe is superior, for water-supply purposes, to iron pipe, and can be furnished at less than half the price. Besides this, it is much lighter to handle, and is not so liable to burst upon freezing as pipe made of iron. Large quantities of this pipe are being put into use by mill owners and mining engineers, as its use results in the saving of water and repair.

ALGERIAN QUARRIES.—The onyx quarries at Ain Smava are very extensive, covering fully 7,500 acres, and the beds vary in width from 6 ft. to 55 ft. The following are the principal qualities of onyx found there and the width of the beds:—

Quality.	Width of Bed. ft.	in.
Golden, with a seam	33	0
Cloudy	13	0
African breccia	13	0
Red African	10	0
Red agate	10	0
Denticulated	1	8
Jasper agate	7	0
Ondulated red	5	0
Rose agate	3	0

From the first two seams columns can be produced with the exceptional length of from 12 ft. to 15 ft. The monolithic columns for the Roman Catholic cathedral at Westminster were obtained from these quarries, which are in the hands of a house at Marseilles, by whom the stone is sent to France to be dressed. The district of Bône is renowned for alabaster of the same density as that of Valterra, in Tuscany. The stone, of great transparency, takes a fine polish and is fully equal to the finest alabaster of Italy and Scotland. An important marble and onyx quarry, situated at Ouled-Rahmoun, is now being worked by a French company. The stones obtained include golden onyx, notched onyx, clouded onyx, red onyx, African red onyx, pink agate, and other varieties. Most of the marbles are similar to those in the ancient monuments of Rome and Carthage.

WHITE SEA TIMBER EXPORTS.—Sir Capel Wolseley, British Vice-Consul at Archangel, in his annual report recently received at the Foreign Office, states that the export of timber from all the White Sea ports amounted in 1903 to 1,097,914*l.*, or about 267,000*l.* less than in 1902. He explains that this year (1904) is the fourth in succession of depression in the timber trade. Among the circumstances which have contributed to this long-continued setback may be mentioned the refusal of the Crown Lands Department either to abate the high rates to which they raised the price of standing trees after the prosperous years 1899 and 1900, or to offer for sale sufficient timber to keep the mills in constant work, even if the owners were prepared to pay the high prices asked. Again, some merchants, in view of the increase of trade which followed the conclusion of peace between France and Germany in 1871, purchased at high prices in anticipation of a large demand from South Africa, and consequent improvement in the general market. The non-realisation of these anticipations may be considered as contributing to the depression of the timber trade. In 1903 the general depression was but little affected by the rise in the price of red wood. Profits on this class of timber were more than counterbalanced by the losses on white wood, the price of which had fallen considerably owing to the increased import to the United Kingdom of Galatz white wood. At the same time the London merchants combined to force down the price of all Archangel timber. This combine was resisted by the Archangel shippers, who, at the close of the season, sold some wood to London buyers at their own prices. At the autumn sales, the Government demanding as before a heavy price for logs, many of the Archangel merchants, anticipating a continuation of low prices in foreign markets, refused to buy, with the result that about 500,000 white wood logs remained unsold. In consequence of this diminution of supply many mills, having sawn all their available logs, laid idle for some three or six months. The 500,000 unsold logs are this year included in the Government offers for sale at the same price as before. The saw-mill owner's present position appears to be a critical one. If he refuses to buy, his mill must be closed as soon as the supply of logs in hand has been sawn; his capital will thus lie idle, and in two years —*i.e.*, in 1906—he will have no sawn wood goods to export. If, on the other hand, he buys logs at the Government price, and the market for sawn timber does not materially improve, he must inevitably suffer heavy loss. It is supposed that, were the merchants to combine in refusing to purchase, the Government would lower its prices; but such action, to be effective, requires a unanimity impracticable in the present case, when any merchant holding aloof from the combine would become possessed of an exclusive supply of timber, with the prospect of sale at a considerably enhanced price. A small saw-mill at Archangel, managed by an Englishman, commenced sawing last year, and exported one cargo. A mill erected in 1901-2 at Korda, in which British shareholders were principally interested, was closed in 1903. A new mill at Pechora, owned by a syndicate comprising five Archangel houses and one London firm, commenced sawing last autumn, and export this year. The export of logs increased from 94.000 to nearly 116,000; that of sleepers from 25,000 to 107,000. Notwithstanding repeated representations by the local authorities the Russian Government has not yet imposed a prohibitive tax on the export of round timber. One cargo of poles, 13,000 pieces, was sent to the United Kingdom. About 63 per cent. of the timber shipments were destined for the United Kingdom.

A NEW WINDOW SASH.—Mr. Tate, of 47, Esmond-road, Kilburn, has submitted to us a model exhibiting the latest of the many contrivances for working a sash window without weights. The sashes are raised by cords passing over pulleys at the top and brought down the side to winding drums in a box below the sill. By means of a winch the sashes are raised by turning the drum. A coiled spring is connected with the gearing to prevent the sash in any case coming down with a run. The sash is held up wherever desired by spring bolts passing through the frame at the side, and released on pulling a cord. Springs are always a weak point in fastenings of this kind; they are apt to lose their grip in course of time; though the compressing spring at the bottom, already mentioned, would probably always retain sufficient resistance to prevent an accident. The thing is, we fear, a little too complicated for general adoption, but it is ingenious and worth attention.

COMBINED DRAINAGE.—The Battersea Borough Council recently wrote to the President of the Local Government Board asking him to receive a deputation from metropolitan municipal bodies on the subject of combined drainage. In reply a letter has just been received stating that the President is of opinion that it is unnecessary to trouble a deputation to wait upon him, and suggesting that all the borough councils favouring immediate legislation in the matter should pass resolutions and forward same to the Board.—Kensington Public Health Committee have reported having passed the following resolution:—"That a communication be addressed to the President of the Local Government Board pointing out that, owing to the present unsatisfactory state of the law with regard to combined drainage, the borough councils throughout the metropolis are now frequently called upon to carry out, at the public expense, works of reparation and reconstruction tending solely to improve the private property of the individual owner, at a great and constantly-increasing cost to the ratepapers, and urging him to do all in his power to remedy, by early legislation, the injustice at present suffered."—The Works Committee of Paddington Borough Council reported on Monday having passed the following resolutions:—(1) That the Battersea Borough Council be informed that, in the event of their convening a conference of the metropolitan borough councils for the purpose of considering the question of combined drainage, and of formulating a proposition for the amendments required in the existing law relating thereto, with a view to making a joint representation on the subject to Parliament, this authority will send representatives; (2) that the London County Council be informed of this action; also that this authority is prepared to support a joint representation to the Government with a view to the question of combined drainage being dealt with as a public measure.

WHITECHAPEL ART GALLERY.—A report of the inquiry in respect of this charity which was held by the Charity Commissioners has just been issued. The endowment consists of the site and buildings, which cost nearly 15,000*l.* There are no invested funds, but an annual grant of 500*l.* for maintenance is made by the central governing body of the City Parochial Foundation. Eleven exhibitions have been held since the establishment of the institution under the Charity Commissioners' scheme of February, 1899. The trustees' accounts for last year show receipts 665*l.*, and expenditure 599*l.*, a balance of 66*l.* being carried forward.

DRAINAGE PLANS.—On Saturday the Public Health Committee of the Kensington Borough Council reported having had under consideration a letter from the London County Council forwarding copy of a communication received from the Royal Institute of British Architects expressing the view that compliance with the by-laws of the County Council respecting the deposit of plans of drainage work involved great and unnecessary expense, and suggesting that the said by-laws should be modified so that they should only require the submission of a block plan and a written description of the pipes and apparatus. In compliance with a request from the authorities at Spring-gardens for the views of the local municipal body upon the foregoing, the Committee had passed a resolution to the effect that, while they concurred in the views put forward by the Royal Institute of British Architects as regards the desirability of some modification beng made in the by-laws in the direction indicated in their communication, the Committee was of opinion that experience has shown that with regard to blocks of flats, and other large and complicated buildings of a like nature, sectional drawings in addition to block plans and detailed descriptions are really indispensable.—On Monday the Works Committee of Stepney Borough Council reported that the Borough Engineer had sent them the following communication on the subject of the letter from the Royal Institute of British Architects:—

The result of my experience is that it is impossible to arrive at a correct conclusion from a block plan whether the construction of a drainage system is likely to be, when carried out, in accordance with the statutory provisions relating thereto. There are other matters beyong that of drainage which have to be considered, such as the sufficiency and position of water-closets, lavatory accommodation, open spaces, etc. Numerous instances have occurred in this borough where building owners and even professional architects have submitted plans which have not complied, at the first application, with the regulations, and in many cases the positions of the water-closets, etc., have been shown in most unsuitable positions; in fact, had block plans only been submitted, it is more that probable that the buildings would have been completed before the defects referred to were discovered. I therefore submit that in these cases the owners of properties have been saved a considerable amount of trouble and expense by the fact that proper plans were sent in in the first instance. Then, again, as to "the great cost and trouble involved in complying with the requirements in connexion with any but the smallest buildings"; as a matter of fact, it is found in actual practice that the architect or builder frequently sends in *sun* copies of the building plans so that the question of "trouble" does not arise, and the extra expense involved is very small even on large buildings. With regard to the statement that "the expense becomes infinitely greater in connexion with existing buildings, as it becomes necessary to measure up the whole of the old buildings and preparation of complete set of drawings," so far as this borough is concerned the statement does *not* apply. Although a large number of public and private buildings have been dealt with, in no case has a builder or owner been requested to furnish more than a block plan and section unless the work has involved a structural alteration or addition, and then only have plans been asked for dealing with the portion of the building where the structural alteration has taken place.

The Committee stated that they had decided that a copy of the above be forwarded to the London County Council with an expression of opinion that, for the reasons given by the engineer, they disagreed with the proposal that the by-laws should be modified as suggested by the Royal Institute of British Architects.—The Public Health Committee of Chelsea Borough Council reported on Monday that they had adopted a communication sent in by the Borough Surveyor and the Medical Officer of Health, in which these gentlemen suggested that the by-laws referred to by the Royal Institute of British Architects should be modified in the following manner:—

(*a*) A detailed plan of the lowest floor of the house, showing the position of the proposed under-

ground drains and manholes, and of the existing drains, the position of water-closet, sinks, gullies, soil and vent pipes, rain water, and other waste pipes. (*b*) A section in block of premises to be drained showing the gradient of underground drains, and positions of soil and ventilating pipe. Note.—These plans to be on a scale not less than 16 ft. to one inch, and all plans to be in duplicate. (*c*) A key plan showing the position of the premises proposed to be drained in conjunction with neighbouring premises. Scale 44 ft. to one inch.

The foregoing suggestions are to be forwarded to the London County Council.—The Highways and Sewers Committee of the Wandsworth Borough Council, in a report circulated on Monday, state that they have decided that the London County Council be informed that the Wandsworth local authority finds the by-laws useful in obtaining plans of drainage works, but that the block plan required by the by-law is all that is insisted upon in Wandsworth, and that the written description mentioned in the letter of the Royal Institute of British Architects is not considered necessary.

THE MYSTERY PLAY, LINCOLN'S-INN.—The Christmas mystery play held on Wednesday at the Lincoln's-inn Hall must be reckoned a great success. It is to be hoped that the experiment will encourage the production of such plays in this country. They have a very definite value in the religious and artistic sense, and though their establishment here, as at Oberammergau, may be impossible and undesirable, original work like that of "Eager Heart," the title of Wednesday's play, will always be acceptable, and command large audiences. We do not know the names of the actors, or of those responsible for the staging, but we believe it was entirely an amateur performance. The play is written by Miss A. M. Buckton, and is published in book form. The story is based upon a legend telling how Christ, as an infant in the arms of Mary his mother, accompanied by Joseph, travels through the land every Christmas Eve seeking the home prepared for their reception. "Eager Fame" and "Eager Sense" make ready to receive the divine visitor with every show of pomp and circumstance. Their humble sister, "Eager Heart," stays at home in her poorly-furnished room. The travellers arrive as beggars, soliciting food and shelter, unrecognised by all; they find shelter in the room of Eager Heart. Here they eventually discover themselves to the three Kings, the shepherds, and Eager Heart. The music is taken from Bach's Christmas Oratorio. The dresses were of the Florentine period; they and the staging were agreeable and effective. Once or twice the colour grouping was very fine. The acting, too, was restrained and in excellent taste throughout.

PROPOSED NEW RESERVOIR, BARNSLEY.—An inquiry was held on the 30th ult. at the Town Hall, Barnsley, by Mr. F. H. Tulloch, Local Government Board Inspector, into the application of the Town Council for permission to borrow a further sum of 60,011*l.* for the completion of the Midhope reservoir. In addition to the Inspector, there were present at the inquiry Mr. H. Horsfield (Town Clerk), Mr. C. E. Hawksley (Consulting Engineer), and Mr. J. H. Taylor (Borough Surveyor and Waterworks Manager).—The Town Clerk explained that in 1896 the Corporation obtained an Act to construct the reservoir, which was estimated by Mr. Hawksley to cost 170,000*l.*, and the work was commenced in 1897. The works were now nearing completion, and on June 7 last the actual cost had been 296,668*l.*, on which date it was estimated by Mr. Hawksley that 19,339*l.* would still be required. The works were perfectly satisfactory excepting the filter beds.—In the course of his evidence Mr. Hawksley explained that the amount now sought for was made up of 14,574*l.* 2s. 5d., the estimate outstanding, which included 10,000*l.* for filter beds, 1,100*l.* for the Wortley service reservoir, and 1,000*l.* for the reservoir keeper's house. Engineer's commission to June 9 amounted to 6,040*l.*; estimated commission on the work yet to be done, 725*l.*—a total, less 2,000*l.*, the estimated value of the plant, of 19,339*l.* 2s. 5d. The reservoir keeper's house included a committee-room, stabling, and coach-house.—After some questions had been asked by the Inspector the inquiry closed.

A NEW LIFTING AND CONVEYING APPARATUS.—We have recently had an opportunity of examining a simple and ingenious form of apparatus which should be of considerable service to constructional engineers, bridge builders, and others, for lifting and conveying girders, rails, heavy pipes, baulks of timber, and other materials. The apparatus, which is made by Messrs. Selig Sonnenthal & Co., of Queen Victoria-street, E.C., consists of one or more vertical rectangular frames, formed of four steel posts connected at top and bottom by horizontal rails so as to constitute a frame of great strength and rigidity. Between the two ends of the frame is a horizontal roller, each end of which is fitted into a bearing in a horizontal cross-bar having screwed holes at the ends, through which pass two vertical screwed shafts. These shafts are made in pairs, screwed with right and left hand threads, and fit at the bottom into footsteps attached to the pedestal of the frame, while at the top they pass through bearings secured to the top framing, each shaft being fitted with a worm wheel, and a worm between each pair of wheels is actuated by means of a handle at the end of the worm shaft. The horizontal roller is employed for raising and lowering loads, and it can be worked up and down quite easily, owing to the great purchase afforded by the worm gear, which also permits the load to be stopped at any point without the slightest risk of dropping. The roller itself can be rotated on its axis by means of a handle, thus giving a traversing movement, right or left hand as desired, for conveying the material in a longitudinal direction. To prevent the roller from rotating when supporting irregularly-shaped objects, a ratchet wheel and catch are provided. The frames are fitted with four handles to facilitate adjustment, and those intended for use on level floors can be fitted at the bottom with travelling wheels or runners. In using the apparatus, the girder or other piece of material to be moved is slightly raised, so that the horizontal roller can be brought beneath it. The roller is then raised by means of the worm gear and vertical shafts, and, as soon as it comes in contact with the load, the latter can be moved forward or backward by rotating the roller. In many cases only one of the lifting frames is required, but when the material has to be transported for more than a few feet, it is necessary to use two of the frames, advancing first one and then the other until the distance has been covered. A still more convenient method is to use three frames, of which any two are always supporting the member to be transported, and the third is placed in advance to afford a fresh bearing. Then, after the load has been moved forward so as to rest upon the two front frames, the hindermost one is brought up to the front, and the same cycle of operations is repeated as often as may be necessary. By suitable placing and adjustment of the apparatus, material can be conveyed over all sorts of obstacles, such as ditches, mounds, and irregularities of the ground, or across gaps in masonry and other structural work. It can also be applied with great advantage in engineering shops and erecting yards as an auxiliary to machine tools, and for other purposes, and, in fact, wherever material has to be lifted or moved about. The frames are made in various sizes, with lifting capacities ranging from 1 ton to 3¾ tons each, and special types are available for certain classes of work. The apparatus described is exceedingly simple, and can be used by ordinary labourers without previous instruction.

CROWN LANDS.—A Bill will be introduced in the course of the ensuing Session to make better provision for the management and regulation of the Royal Forests, and for giving the Commissioners of Woods and Forests increased powers for exercising control over the discharge of sewage, the placing of refuse, the erection of encampments and booths, and the exclusion of gipsies, hawkers, rogues, and vagabonds. The Bill also provides for a transfer of any fore-shore under the Commissioners' management to that of the Board of Trade, and *vice versa*, and for authorising the Commissioners and the Board of Trade, and the Chancellor and Council of the Duchy of Lancaster, respectively, to compromise claims to fore-shore as between the Crown and the Duchy, and claims to management as between the Commissioners and the Board of Trade, and for the abolition of the obligation to devote allotments to the Crown in East Bere, Alice Holt, and Parkhurst woods, co. Southampton, to the growth of timber.

SCIENCE AND ART DEPARTMENT, BOARD OF EDUCATION.—The report for the year 1903 on the Victoria and Albert Museum, the Royal Colleges of Science and of Art, the Geological Survey and Museum, and the work of the Solar Physics Committee has just been issued. The number of visitors to the science library shows an increase of about 10 per cent. over the number for the previous year, but a slight decrease in the attendances of readers (exclusively of Royal College of Art students) in the National Art Library of the Victoria and Albert Museum, and a decrease in the number of visitors to the branch museum at Bethnal Green. During the session 1902-3 of the Royal College of Science the total number of students under instruction was 304, of whom 165 were Government students. The students in the Royal College of Art were 167 in all, as compared with 183 in the last preceding session. There was a marked increase in the number of classes who visited the Western Galleries with their teachers for scientific instruction and research.

CAPITAL AND LABOUR.

BIRMINGHAM BUILDING TRADES' FEDERATION.—For some years past (writes a correspondent) there has been a federation in Birmingham called the "Birmingham Building Trades' Federation." Its operations affect all districts of Birmingham within a radius of five miles from Stephenson-place. The federation consists of sixteen trades engaged in building operations, and it is managed by an executive elected annually at the general meeting. For some time past certain sections of the trades—namely, the plasterers and painters—have been agitating that, in case of any dispute arising between employers and men, the whole of the trades combined should withdraw their men from the job or jobs upon which they were engaged until such employer had agreed to their terms. Owing to the decision in the Taff Vale case the executive of the federation could not see their way to comply with such demand. On a specially large building in course of erection by a well-known employer in Birmingham painters, etc., had been employed and not paid the standard rate of wages. This case was brought before the federation on November 3, when the organising secretary of the plasterers and representatives of the painters demanded the withdrawal of all the men on November 14. The executive could not see their way to adopt this course owing to the arrangements existing between the men and the Conciliation Board of Masters, and, in consequence, an adjourned meeting was held on Thursday last week at the Trades' Hall, Hurst-street, when the following resolution was passed after strong and determined opposition:—"That, seeing it is impossible to carry out the principle of the work the federation was formed for, and always aimed at, through all societies refusing to combine for that purpose at the present time, the federation be at once dissolved, according to rule 20." It was also decided that "the executive committee of the federation should, in conjunction with the trustees, treasurer, president, and secretary, take steps to see that the income over expenditure year by year be proportionally divided among the societies contributing to the federation during the years the federation has been in existence; and that the cost of winding-up the federation should be equally borne by all societies federated." The cash balance is upwards of 1,000*l.* The effect of the resolution passed is that each society will have to stand upon its own basis; that is, the labourers in any case of dispute will not have the support of the carpenters, plasterers, etc., and, of course, *vice versa* throughout all trades. What the ultimate result will be is doubtful. Whether it will mean a reduction in wages by the Masters' Association after attacking first one and then the other of the trades in question, or whether they will only attack those that have caused such divided opinion in the building trade, remains to be seen. Meanwhile the most thoughtful and calm members of the societies affected are anxiously awaiting the effects of the split.—*Birmingham Daily Post.*

Legal.

POINT UNDER THE METROPOLIS MANAGEMENT ACT, 1855.

IN the Court of Appeal, composed of the Master of the Rolls and Lords Justices Stirling and Mathews, on the 6th inst., the case of the Metropolitan Water Board *v.* the Mayor, etc., of Westminster, was heard, on the appeal of the Water Board (the successors of the New River Company) from a decision of a Divisional Court of King's Bench, consisting of the Lord Chief Justice and Justices Wills and Kennedy, affirming a decision of Mr. Bros, the Metropolitan Stipendiary.

(The case before the Divisional Court was reported in the *Builder* of May 21, 1904.)

The matter came before the Court in the form of a special case, from which it appeared that the Company were summoned before the magistrate by the respondents for neglecting to pay a certain sum alleged to be due to the respondents for expenses incurred in filling, making good, and maintaining the pavements in streets in Westminster when the same had been broken up by the Company, in pursuance of its statutory powers to execute work in the City of Westminster. The sum which

the respondents claimed included a charge of 10 per cent. on the cost of the work to cover the respondents' estimate of the expense to which they had been put for superintending the work during its execution by a contractor. The Company's contention was that by virtue of section 114 of the Metropolis Management Act, 1855, the respondents were not entitled to make any charge for supervision or superintendence, notwithstanding that it was given, and that the same formed part of the general administrative duties of the respondents. The respondents, on the other hand, contended that the employment of officers to superintend and supervise such work was a necessary expense incurred by the Corporation in carrying out the work of reinstatement. The learned magistrate came to the conclusion that the respondents were entitled to recover a sum for the expenses incurred in respect of the supervision or superintendence of the work, but he reserved the question of the amount to which the respondents were entitled in respect of such superintendence and supervision, and whether it should be calculated on a percentage or other basis pending the decision of the High Court as to whether the respondents were legally entitled to make any claim in respect thereof. The Divisional Court upheld the decision of the learned magistrate, and remitted the case to him in order that he might determine the question of amount. From this decision the Water Board now appealed.

During the course of the arguments Mr. Morton Smith, for the respondents, stated that the only claim put forward was for the cost of superintendence thrown upon the respondents, which would not have fallen upon them had the Water Board or their predecessors done the work themselves.

Mr. Coulthorpe Munroe did not agree with this statement. The claim put forward in the police court was to 10 per cent. on the actual expenditure for supervision.

The Master of the Rolls said the case must go back to have a direct finding of fact whether there had been, in this case, any substantial extra expense incurred by the respondents owing to their undertaking the work themselves. When this was ascertained the Court would be in a position to decide on the true construction of the Act of Parliament.

ACTION AGAINST A BUILDER.

THE case of the General Accident Assurance Corporation, Ltd., *v.* Day came before Mr. Justice Buckley in the Chancery Division, on the 1st inst.—an action by the plaintiffs against defendant for an account of the wages paid by him during the time he was insured against his liability under the Workmen's Compensation Act, 1897, the Employers' Liability Act, 1889, or at Common Law in respect of accidents to his workmen. The facts giving rise to the action were these:—The defendant, a builder, in September, 1901, signed a proposal to the plaintiff company for an insurance against his liability in regard to accidents to his workmen. The defendant therein stated that the total estimated amount of the wages paid by him and his sub-contractors yearly was 3,000*l.*, and he agreed to pay premium of 5s. 6d. per cent. on the total amount of wages and salaries paid, and to render to the plaintiffs at the end of each period of insurance a statement, in the form required by the Corporation, of all wages actually paid, and to pay premium on any wages paid in excess of the amount estimated in the proposal form. The policy, which was issued on September 21, 1901, recited that the defendant had paid a sum of 8*l.* 5s. on account of premium, and had delivered a proposal in writing which was to form part of the contract, and that the plaintiffs agreed to indemnify him against liability as before mentioned. The 4th clause of the policy provided that the first and all future renewal premiums that might be accepted were to be regulated by the amount of wages and salaries paid to employés, and sums paid to sub-contractors by the employer during each year. It further directed that the names of every employé and sub-contractor, with the sums paid, should be entered in a proper book, and that no claim should be covered by the policy unless this should be done. It was also provided that every sub-contractor should, as far as possible, be required to keep a similar wages book so as to ascertain the employés entitled to call upon the employer for compensation; but in the event of the wages paid by any sub-contractor not being so ascertained, then, for the purposes of the policy, they were to be taken to be a sum equal to 60 per cent. of the sum agreed to be paid to such contractor for such work. Another term of the policy was that the employer should at all times allow the Corporation to inspect the wages book, and would, on request, supply to the Corporation a correct account of all sums paid during any year of insurance, and if the total amount so paid should differ from the amount on which premium had been paid, the difference in premium should be met by a further proportionate payment to the Corporation, or by a refund by the Corporation, as the case might be. The policy was in force until September, 1903, when the defendant allowed it to lapse, and insured in another office. The plaintiffs, after making applications to the defendant for accounts of wages actually paid without receiving any answer, commenced the present action for an account of such wages during the two years in which the defendant was insured. The defendant, by his defence, denied that he was now bound to account, and his counsel stated that the wages he had paid were really less than the estimated amount.

At the conclusion of the arguments of counsel his lordship held that the plaintiffs were entitled to the account and the costs of the action up to the present time, the further costs being reserved.

Mr. Astbury, K.C., and Mr. Edward Ford appeared for the plaintiffs, and Mr. Buckmaster, K.C., and Mr. Humphry for the defendant.

HODGSON *v.* WAUGH.

ON the 5th inst., Mr. Montague Lush, K.C., mentioned this case to the Lord Chief Justice in the King's Bench Division. (A report of the case appeared in last week's issue of the *Builder*.)

The learned counsel said his lordship would remember that the action was brought by Mr. Hodgson, the proprietor of an estate in Hertfordshire, known as Hexton Manor, against the defendant, Mr. John Waugh, an architect and civil engineer, for damages for alleged negligence in connexion with certain extensive alterations and repairs at Hexton. His lordship would also probably remember that, at the close of the case, in which his lordship reserved judgment, he (counsel) said he wished to disclaim any intention of imputing to the defendant any charge of fraud or dishonesty on his part. His lordship at that time asked if such disclaimer was made on the authority of the plaintiff, and he (counsel) was unable to say that it was, seeing his client had at that time left the court. Since then he had had an opportunity of communicating with his client, and he was now authorised to state that Mr. Hodgson most unreservedly and entirely approved of the withdrawal of any charges that had been made against Mr. Waugh of fraud or dishonesty. Mr. Hodgson had understood that no suggestions were made, and personally he had not wished them to be made.

The Lord Chief Justice said that certain questions which had been put were only consistent with charges of improper conduct, but the withdrawal was satisfactory, and would relieve him of a difficult part of the case. He was glad that the withdrawal of the charges was made with Mr. Hodgson's authority, and he hoped that publicity would be given to it. His lordship said he hoped to be able to give judgment on Monday week.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

24,473 of 1903.—F. JACOB: *Device for Opening and Closing Windows of Greenhouses, and the like.*

A device for closing and opening casements and windows to any required degree, characterised by the fact that a chain passing round a pulley is provided upon one end with a handle, and is connected by its other one to the casement or window rod to be operated, this chain comprising hollow oscillating links arranged alternately, a pawl oscillating upon a block to which the pulley is fitted, and engaged normally in one of the hollow links of the chain permitting the latter to move for opening the window, but preventing all motion of the chain in the opposite direction, an oscillating lever, arranged upon the said block, releasing, when a force is exerted thereupon with the handle end of the chain, the said pawl, and thus permitting the movement of the chain for closing the casement, this movement being stopped at any required instant by ceasing the pressure upon the said lever, and several levers being adaptable to said block, to correspond with the operation of several casements arranged in nearly the same plane.

24,618 of 1903.—A. SILBIGER: *Building and Decorating Materials.*

A building and decorative material formed by the combination of cement and asbestos, kieselguhr or vegetable fibre in the proportions of from 10 per cent. to 25 per cent. of asbestos, kieselguhr or vegetable fibre, and from 90 per cent. to 75 per cent. of cement, subjected to great pressure in the humid or plastic state.

26,168 of 1903.—P. KIRKUP, A. P. STOKER, F. BOWMAN, and W. ALDERSON: *Machines for Cutting Coal, Stone, and other Hard Substances.*

Machines for cutting coal, stone, or other hard substances, consisting of a frame supported on a skate or skates on the coal side, and rollers on the side remote from the coal "face," or by a skate or skates on both sides, and provided with a fender adapted to bear against the "goaf" props or chocks, and also with a horizontal roller adapted to bear against the coal "face," said fender and roller being disposed in the same plane or nearly so as the horizontal cutter of the machine.

27,919 of 1903.—J. HARRIS: *Machinery or Apparatus for Making Tiles.*

A tile-making machine, consisting of a main horizontal cylinder revolving in bearings in a frame, an upper parallel cylinder revolving in adjustable bearings in the same frame and pressed down by springs, an inclined frame provided with freely revolving rollers and having one end adjustable in the frame of the machine above the main cylinder and capable of slight movement horizontally and its other end adjustable vertically in the upper end of an independent vertical frame at a sufficient distance from the main frame, a flexible endless apron or band passing over the upper cylinder and thence down and back between the two cylinders and down round the outer side of the main cylinder, then forward and inclining downward from a sufficient distance, and over and round a roller turning in adjustable bearings, in the outer end of a more or less horizontal frame pivoted near its front end to the main frame of the machine, and provided with freely revolving rollers on its upper side, and back below this pivoted frame and under and round a roller upon the inner end of the pivoted frame, thence up in front of the machine and over a guiding roller carried by the main frame, and up to the top of the upper cylinder at the point where it started so as to form an endless apron, flanges upon the lower main cylinder between which the upper cylinder revolves, fine strong adjustable wires stretched at suitable distances apart between the flanges on the main cylinder for the purpose of cutting into the required lengths a strip of clay delivered continuously forward from a pug-mill upon the rollers at the back end of the upper adjustable frame, and forced between the two main cylinders of the machine which is kept in movement by the weight and pressure of the strip of clay.

308 of 1904.—R. C. HUGHES: *Window Sash Fastener.*

A window sash fastener, comprising a socket, or casing attachable to one part of a window and having a cylindrical bolt provided with a helical spring, one end of which is secured to the bolt while the other end is fixed in or to the casing, a catch on the said bolt, means for retaining the catch when the bolt is in the bolted and unbolted positions, and a hole or holes in the other part of the window adapted to receive the bolt.

444 of 1904.—C. MATHEWS: *Water Waste Preventers.*

A water waste preventer, consisting in the combination with the tank and the ordinary pull chain or lever of mechanism which, when operated by the said chain or levers, opens a supply tap or inlet valve and closes outlet pipe or its valve, and means whereby the water, when it reaches a certain height in the cistern, shuts or closes the supply tap or inlet valve and opens the outlet pipe or its valve to permit the contents of the tank to escape.

512 of 1904.—P. BLOWES: *Treads for Stairs, Passages, Paving, and other like Surfaces.*

Tiles for forming treads for stairs, passages, paving, and other like surfaces manufactured of artificial stone with projecting parts or pebbles disposed so as to leave passages or channels between them leading into main channels formed in the fronts and sides of the finishing tiles.

613 of 1904.—H. C. CLEAVER: *Open Fireplaces.*

A fireplace for burning anthracite and like refractory or non-caking fuel upon an open grate, consisting essentially of a forwardly inclined apertured fire grate, a hopper

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

adapted to continuously deliver fuel by gravity to the upper extremity of the grate, a fence or kerb situated at the lower extremity of the grate so as to limit the descent of the fuel, and a flue for the escape of the gaseous products of combustion from the space beneath the grate.

1,470 of 1904.—A. J. BOULT (Internationale Siegwartbalken Gesellschaft): *Apparatus for Cutting Artificial Stone, Beams, Girders, and other Structures.*

An apparatus for cutting a composite cast plate of artificial stone into separate sections characterised by a single cutter movable in a vertical plane vertically or obliquely relatively to the section to be cut, which cutter is carried by slides, guided in a movable frame and provided with toothed pinions which engage with toothed racks arranged in the frame, movement being transmitted to the toothed pinions by means of worm wheels and worms.

20,210 of 1904.—R. H. MCWILLIAMS: *Mode of and Means for Copying the Grained Surfaces of Wood and Transferring same to other Wood Paper Fabric, Floor Covering, and the like.*

A method for producing a printing surface, which consists of thoroughly cleaning the surface of a selected piece of wood, then covering the same with oil to render it non-adhesive, then applying to the prepared surface a sensitive composition with a backing of fabric material.

21,280 of 1904.—M. ROSEN: *Construction of Theatres, Hospitals, and Similar Buildings.*

This invention relates to the construction of theatres, hospitals, barracks, schools, and like buildings. The object of the invention is to provide exits which, in case of fire, allow a great number of people to leave the rooms at the same time. This invention consists in the substitution of the stairs by flat gangways with suitable inclination.

21,619 of 1904.—E. ESCHWEGE: *Folding Furniture.*

This relates to folding furniture, and consists of a pair of rods, a sheet of fabric secured to the same, removable bars holding said rods apart, and supporting members removably secured to the frame so formed, whereby the fabric may be rolled up on the rods, the removable members having first been detached and placed therein.

27,878 of 1903.—C. ALLEN and G. A. HAWTHORN: *Spouts, Waterways, and Cornices for Buildings.*

A spout or waterway constructed of a series of contiguous sections, each section consisting of a brick or block of stone or other material suitably curved or channelled and otherwise fashioned so as at the same time to serve an additional purpose beyond that of a spout section.

19,493 of 1904.—B. A. STEVENS: *Apparatus for Preventing the Spread of Fire in Theatres, and the like.*

This relates to an auditorium, consisting of a flue, leading therefrom a second flue within the first-named flue, combustible material in said first-named flue, and means for igniting said combustible material at the commencement of a fire, means for closing the first-named flue, arranged to be removed to open said flue when ignition takes place.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

November 24.—By MADDISON, MILES, & MADDISON (at Gorleston).

Gorleston, Suffolk.—213, High-st., f., w.r. 11*l.* 14s.	£148
Bull-la, freehold trade premises, stabling, etc., p.	110
Frederick-rd., a plot of freehold building land	100

November 25.—S. WALKER & SON (at Brecon).

Brecon.—14 and 15, High-st., "Warwick House" (s.) and house in rear, f., y.r. 90*l.*	1,800
25, 26, and 27, The Watton, also the "Clarence Inn," area 2,117 yds., f., y.r. 63*l.*	1,010
44, 45, and 46, The Watton, with garden ground, area 5,000 yards, f., y.r. 45*l.*	660
1 to 12, Bowen-ter., f., y.r. 305*l.* (in lots)	5,045
Cerig-Cochion-rd., "Caedryssy Villa," y.r. 35*l.*; also garden ground, f.	900
1 and 2, Caedryssy-cottages, f., y.r. 28*l.*	575
Llangenny, Brecon.—"Danycefn Farm," 58 a. 2 r. 30 p., f., y.r. 35*l.*	1,190

November 26.—GLAZIER & SONS (at Reading).

Twyford, Berks.—Main-rd, freehold building land, 13 a. 2 r. 13 p.	1,435
Woodley, Berks.—The "Lands End" b.h. and 0 a. 3 r. 7 p., f., y.r. 27*l.* 10s.	610
Six freehold cottages and 0 a. 2 r. 33 p.	720
Hurst, Berks.—Various enclosures, 21 a. 1 r. 37 p., f.	1,070
Three freehold cottages and 1 a. 2 r. 29 p.	780
Enclosures of pasture, 76 a. 1 r. 35 p., f.	1,750

November 28.—By ELLIOTT, SON, & BOYTON.

Regent's Park.—Cambridge-ter., l.g.r. 100*l.*, u.t. 19½ yrs., g.r. 16*l.*	£1,020
Albany-st., l.g.r. 30*l.*, u.t. 19½ yrs., g.r. 4*l.*	365
Harlesden.—64, Nicoll-rd. (s.), u.t. 72½ yrs., g.r. 5*l.*, y.r. 55*l.*	565

By HARRODS'.

Brompton.—5, Beaufort-gdns., f., y.r. 220*l.*	4,000

By VENTOM, BULL, & COOPER.

Kilburn.—47, High-rd. (s.), and 4, Manor-mews, u.t. 54 yrs., g.r. 18*l.*, y.r. 140*l.*	2,025
59, High-rd. (s.), u.t. 54 yrs., g.r. 15*l.*, y.r. 150*l.*	1,955
96, High-rd. (s.), u.t. 70 yrs., g.r. 16*l.*, y.r. 160*l.*	3,260
111, High-rd. (s.), u.t. 56½ yrs, g.r. 12*l.*, y.r. 120*l.*	2,060
Brondesbury.—342 and 346, High-rd. (s.), u.t. 70½ yrs., g.r., etc., 31*l.* 12s., y.r. 272*l.*	4,295
South Kensington.—7, 9, and 10, Colehernetter. (s), u.t. 45½ yrs., g.r. 45*l.*, y.r. 354*l.*	4,920
Gray's Inn-road.—1, Frederick-st. (s.), u.t. 17¾ yrs., g.r. 10*l.*, y.r. 75*l.*	440
Camden Town.—208, High-st. (s.), and 11, Stucley-pl. (s.), u.t. 24½ yrs., g.r. 7*l.* 10s. y.r. 116*l.*	810
Notting Hill.—77, Golborne-rd. (s.), u.t. 62 yrs., g.r. 10*l.*, y.r. 65*l.*	700
Woodford.—Primrose-rd., a plot of freehold building land	150
Kilburn.—6, 8, and 10, Kingsley-rd., u.t. 81 yrs., g.r. 18*l.*, y.r. 106*l.*	950

By ALFRED RICHARDS (at Tottenham).

Edmonton.—11 to 21 (odd), Union-rd., u.t. 92½ yrs., g.r. 30*l.*, w.r. 115*l.* 14s.	150
1 to 17 (odd) and 2 to 10 (even), Gilpin-cres., u.t. 92½ yrs., g.r. 82*l.* 10s., w.r. 351*l.*	370

November 29.—By BEARD & SON.

Norwood.—59, Farquhar-rd., y.r. 75*l.*; also 2, Jasper-rd., p., u.t. 31¾ yrs., g.r. 40*l.*	1,350
Kilburn.—28, Willesden-la. (s.), u.t. 89 yrs., g.r. 14*l.* 14s., e.r. 70*l.*	555

By C. H. BROWN.

Highbury.—4, Crane-gr., u.t. 46½ yrs., g.r. 4*l.*, y.r. 40*l.*	350
21, Albert-st., u.t. 43 yrs., g.r. 6*l.*, y.r. 38*l.*	285

By WM. HOUGHTON.

Walthamstow.—31, North-rd., f., w.r. 23*l.* 8s.	225
St. John's Wood.—9, Henry-st. (s.), u.t. 12¾ yrs., g.r. 3*l.*, y.r. 32*l.*	185

By ALFRED RICHARDS (at New Barnet).

East Barnet, Herts.—1 to 9 (odd), 15, 17, 2 to 12, 18 to 34 (even) and 25B, Fergusson-rd., u.t. 94 yrs., g.r. 172*l.* 10s., e.r. 860*l.*	1,560

By WYER, ADAMS, & GLOVER (at Masons' Hall Tavern).

Clapham.—The Pavement, "The Cock Tavern," u.t. 30 yrs., y.r. 100*l.*, with goodwill	5,000

By W. H. HANSON & WHEELDON (at Gainsborough).

Upton, Lincs.—A freehold farm, 150 a. 1 r. 27 p., y.r. 160*l.*	3,250

November 30.—By BROWETT & TAYLOR.

Canning Town.—1, 3, 5, 7, and 9, Liverpool-rd., f., w.r. 170*l.* 6s.	1,270

By DYER, SON, & HILTON.

Woolwich.—Church-st., f.g. rents 20*l.*, reversion in 4½ yrs.	2,415

By SAUNDERS & TAYLOR.

Hampton, Middlesex. — Wolseley-cottages, f.g.r. 10*l.*, reversion in 98 yrs.	225

By R. TIDEY & SON.

Kingsland.—2, High-st. (s.), f., y.r. 150*l.*	3,570
451, Kingsland-rd. (s.), u.t. 21 yrs., g.r. 6*l.*, y.r. 50*l.*	140

By WYATT & SON (at Chichester).

Chichester, Surrey.—4, Oving-rd., f., p.	360
8 to 15, Melbourne-rd, f., w.r. 108*l.* 11s.	1,030
Chapel-st., a freehold store, p.	250
17, 18, 21, 22, and 23, Green-la., f., w.r. 72*l.* 3s.	900
Selsey, Sussex.—New-rd., a freehold residence, e.r. 36*l.*	500

By C. R. MORRIS, SONS, & PEARD (at Bridgwater).

Bishops Lydeard, Somerset.—"Bishpool" and "Lambridge" farms, 327 a. 2 r. 8 p., f.	5,100
Lympsham, Som.—"Hobbs' Boat Inn" and 3 a. 2 r. 18 p., f.	970
Enclosures of land, 5 a. 1 r. 31 p., f.	385
Bleadon, Som.—Enclosures of land, 56 a. 1 r. 9 p., f.	3,100

December 1.—By P. E. BRAND & Co.

Ilford.—Connaught-rd., three freehold building plots	240

By C. C. & T. MOORE.

Poplar.—Park-pl., the "Steam Packet Inn," a freehold rental of 65*l.*, reversion in 12½ yrs.	1,560
Peckham.—14, 16, and 18, Buchan-rd., u.t. 71 yrs., g.r. 15*l.*, w.r. 80*l.* 12s.	585
Deptford.—48 to 54 (even), Cornbury-rd., u.t. 71 yrs., g.r. 18*l.*, w.r. 139*l.* 2s.	860
19 to 25 (odd), Rudford-rd., u.t. 71 yrs., g.r. 18*l.*, w.r. 127*l.* 8s.	830
14, 20, to 32 (even), 33, 35, 39, and 41, Edale-rd., u.t. 71 yrs., g.r. 59*l.* 10s., w.r. 425*l.* 2s.	2,780
Rotherhithe.—133 to 143 (odd), Silwood-st., u.t. 71 yrs., g.r. 27*l.*, w.r. 198*l.* 18s.	1,010
Poplar.—2 and 3, Park-pl., f., and 1, 2, and 3, Holker-pl., c., area 9,000 ft.	810
Limehouse.—119 to 125 (odd), Three Colt-st., also "King's Boat Yard," area 11,000 ft., f., y.r. 90*l.*	1,600
129 and 131, Three Colt-st., and 37 to 43, Phœbe-st., f., y.r. 161*l.* 6s.	1,210
102 and 104, Gill-st., and 31 to 36, Phœbe-st., f., w.r. 148*l.* 4s.	1,180
Poplar.—69 to 80, Park-st., f., w.r. 263*l.* 12s.	2,040

By NEWBON, EDWARDS, & SHEPHARD.

Somers Town.—22 and 24, Werrington-st. (s.), u.t. 45 yrs., g.r. 12*l.*, w.r. 108*l.* 11s.	465
Holloway.—Tollington-rd., l.g.r. 39*l.*, u.t. 38 yrs., g.r. 15*l.*	375

By HERRING, SON, & DAW (on the premises).

East Molesey, Surrey.—Tagg's Island, including "Tagg's Island Hotel"; also boat houses, etc., area 5½ a. A profit rental of 56*l.* 6s. for 6 yrs.	£705

December 2.—By DRIVER, JONAS, & CO.

Tooting.—Upper Tooting-rd., etc., a freehold building estate with three residences thereon, area 7 a. 1 r. 3 p., p.	20,650
Stoke Newington.—High-st., f.g.r. 75*l.*, reversion in 24¾ yrs.	2,200
High-st., f.g.r. 60*l.*, reversion in 6¾ yrs.	3,000
High-st., f.g.r. 40*l.*, reversion in 15¼ yrs.	1,250

By TYSER, GREENWOOD, & CRIER.

South Kensington.—20 and 22, Pond-pl., and 9 and 10, Bury-st. (s.), u.t. 43 yrs., g.r. 50*l.*, y.r. 156*l.*	235
Chiswick.—21, Ellesmere-rd., u.t. 97¼ yrs., g.r. 9*l.* 9s., e.r. 50*l.*	560

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

MEETINGS.

FRIDAY, DECEMBER 9.

Architectural Association.—Paper by Mr. T. Raffles Davison, entitled "Some Architectural Reflections." 7.15 p.m.

Edinburgh Architectural Association. — Associates' Annual Dinner.

SATURDAY, DECEMBER 10.

British Association of Waterworks Engineers (Ninth Winter Meeting at the Geological Society's Rooms, Burlington House, W.).—(1) Ballots will be taken for the Council and Officers for 1905-6, and for new Members and Associates; (2) Paper entitled "The Appleton Extensions of the Warrington Corporation Waterworks," by Mr. Geo. Mitchell; (3) Paper on "Supply of Surface and Underground Water to Towns," by Mr. Frank Latham; (4) Paper entitled "Notes on Electrically-driven Pumping Plant for Water Supply, and Storage of Water under Pressure," by Mr. J. Hutton; (5) Presentation to Dr. Kemna of Gift subscribed by Members and Friends who took part in the Tour in Belgium. 11 p.m.

MONDAY, DECEMBER 12.

London Institution.—Address by Mr. George Clausen, A.R.A., entitled "A Sketch of the Development of Painting." Illustrated. 3 p.m.

Surveyors' Institution.—Mr. J. Jopling on "Clay Working, more Particularly Bricks and Tiles." 4 p.m.

Bristol Society of Architects.—M. Mouchel on "The Hennebique System of Concrete Construction." 8 p.m.

TUESDAY, DECEMBER 13.

Cardiff, South Wales, and Monmouthshire Architects' Society.—Mr. Edwin Seward on "Northern Italy." 8 p.m.

Institution of Civil Engineers.—Paper to be submitted for discussion "On the Construction of a Concrete Railway Viaduct," by Messrs. Wood-Hill, and E. Davy Pain, B.A. 8 p.m.

WEDNESDAY, DECEMBER 14.

Architectural Association, Discussion Section.—Paper by Mr. Theodore Fyfe, entitled "Concerning the Natural Lighting of Interiors." 7.30 p.m.

Glasgow Philosophical Society (Joint Meeting with Glasgow Architectural Association).—Mr. Horatio K. Bromhead on "Registration of Architects." 8 p.m.

Edinburgh Architectural Association.—"A Talk on Metal Work," by Mr. Nelson Dawson, with Lantern Slides. 8 p.m.

Society of Arts.—Mr. Chas. D. Abel on "The Patent Laws." 8 p.m.

THURSDAY, DECEMBER 15.

Leeds and Yorkshire Architectural Society.—Professor Capper on "Choisy's Researches in Ancient Building Construction." 6.30 p.m.

Institution of Electrical Engineers.—8 p.m.

Institute of Sanitary Engineers, Ltd. (Lectures on Practical Sanitary Science).—Dr. J. C. Thresh on "Water and Water Supply." II. 7 p.m.

FRIDAY, DECEMBER 16.

Institution of Mechanical Engineers.—(1) Paper to be read and discussed, entitled "Heat Treatment Experiments with Chrome-Vanadium Steel," by Capt. H. Riall Sankey and Mr. J. Kent-Smith; (2) Messrs. Seaton and Jude's Paper on "Impact Tests on the Wrought Steels of Commerce," which was read at the last meeting, will be further discussed jointly with the above Paper. 8 p.m.

Institution of Civil Engineers (Students' Meeting)—Mr. R. H. Lee Pennell on "Folkestone Harbour: Cylinder-Sinking at the Root of the Old Pier." 8 p.m.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 12 0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1 8 0	" " "
Facing Stocks	2 10 0	" " "
Shippers	2 8 0	" " "
Flettons	1 8 0	" at railway depôt.
Red Wire Cuts	1 14 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire	4 4 0	" " "
Do. Bullnose	4 10 0	" " "
Best Stourbridge Fire Bricks	4 8 0	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers	13 0 0	" " "
Headers	12 0 0	" " "
Quoins, Bullnose, and Flats	17 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers	16 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamferred, Squints	20 0 0	" " "
Best Dipped Salt Glazed Stretchers, and Header	12 0 0	" " "
Quoins, Bullnose, and Flats	14 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers	14 0 0	" " "
One Side and two Ends	15 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays, Chamferred, Squints	14 0 0	" " "
Second Quality White and Dipped Salt Glazed	2 0 0	less than best.

	s. d.	
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	6 0	" "
Best Portland Cement	29 0	per ton, "
Best Ground Blue Lias Lime	20 0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 6d. per ton at rly. dpt.

STONE.

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	" "
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2 1	" "
White Basebed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2 2½	" "

	s. d.	
Ancaster in blocks	1 11	per ft. cube, deld. rly. depôt.
Beer "	1 6	" "
Greenshill "	1 10	" "
Darley Dale in blocks	2 4	" "
Red Corsehill "	2 5	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "

YORK STONE—*Robin Hood Quality.*

Scappled random blocks	2 10	" "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super. "
6 in. rubbed two sides ditto, ditto	2 6	" "
3 in. sawn two sides slabs (random sizes)	0 11½	" "
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	" "
1½ in. to 2 in. ditto, ditto	0 6	" "

HARD YORK—

Scappled random blocks	3 0	per ft. cube, "
6 in. sawn two sides, landings to sizes (under 40 ft. super.)	2 8	per ft. super. "
6 in. rubbed two sides ditto	3 0	" "
3 in. sawn two sides (slabs random sizes)	1 2	" "
2 in. self-faced random flags	0 5	" "

STONE (*continued*).

HARD YORK (*continued*)—	s. d.	
Hopton Wood (Hard Bed) in blocks	2 3	per ft. cube. deld. rly. depôt.
" " " 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt.
" " " 3 in. do.	1 2½	" "

SLATES.

in. in.	£ s. d.	
20 × 10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20 × 12 " "	13 17 6	" "
20 × 10 first quality "	13 0 0	" "
20 × 12 " " "	13 15 0	" "
16 × 8 " " "	7 5 0	" "
20 × 10 best blue Portmadoc	12 12 6	" "
16 × 8 " "	6 12 6	" "
20 × 10 best Eureka unfading green	15 17 6	" "
20 × 12 " "	18 7 6	" "
18 × 10 " "	13 5 0	" "
16 × 8 " "	10 5 0	" "
20 × 10 permanent green	11 12 6	" "
18 × 10 " "	9 12 6	" "
16 × 8 " "	6 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles	42 0	per 1000 at rly. depôt.
Hip and Valley tiles	3 7	per doz. " "
Best Brosely tiles	50 0	per 1000 " "
Do. Ornamental tiles	52 6	" " "
Hip and Valley tiles	4 0	per doz. " "
Best Ruabon red, brown, or brindled do. (Edwards)	57 6	per 1000 " "
Do. Ornamental do	60 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 0	" " "
Best Red or Mottled Staffordshire do. (Peakes)	51 9	per 1000 " "
Do. Ornamental do	54 6	" " "
Hip tiles	4 1	per doz. " "
Valley tiles	3 8	" " "
Best "Rosemary" brand plain tiles	48 0	per 1000 " "
Best Ornamental tiles	50 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 8	" " "
Best "Hartshill" brand plain tiles, sand faced	50 0	per 1000 " "
Do. pressed	47 6	" " "
Do. Ornamental do	50 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 6	" " "

WOOD.

	At per standard. £ s. d.	£ s. d.	
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in	15 10 0	16 10 0	
Deals: best 3 by 4	14 10 0	15 10 0	
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 10 0	12 10 0	
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.	
Deals: seconds	1 0 0	less than best	
Battens: seconds	0 10 0	" " "	
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	9 10 0	
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0	9 10 0	
Foreign Sawn Boards—1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.	
¾ in.	1 0 0	"	
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4 10 0	5 0 0	
Seconds	4 5 0	4 10 0	
Small timber (8 in. to 10 in.)	3 12 6	3 15 0	
Small timber (6 in. to 8 in.)	3 0 0	3 10 0	
Swedish balks	2 15 0	3 0 0	
Pitch-pine timber (30 ft. average)	3 5 0	3 15 0	

JOINERS' WOOD.	At per standard. £ s. d.	£ s. d.	
White Sea: first yellow deals, 3 in. by 11 in	23 0 0	24 0 0	
3 in. by 9 in.	21 0 0	22 10 0	
Battens, 2½ in. and 3 in. by 7 in.	17 0 0	18 10 0	
Second yellow deals, 3 in by 11 in.	18 10 0	20 0 0	
" " 3 in. by 9 in.	17 10 0	19 0 0	
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0	
Third yellow deals, 3 in. by 11 in. and 9 in.	15 10 0	16 10 0	
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	12 10 0	
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0	22 10 0	
Do. 3 in. by 9 in.	18 0 0	19 10 0	
Battens	13 10 0	15 0 0	
Second yellow deals, 3 in. by 11 in.	16 0 0	17 0 0	
Do. 3 in. by 9 in.	14 10 0	16 0 0	
Battens	11 0 0	12 10 0	
Third yellow deals, 3 in. by 11 in.	13 10 0	14 0 0	
Do. 3 in. by 9 in.	13 0 0	14 0 0	
Battens	10 0 0	11 0 0	
White Sea and Petersburg:—			
First white deals, 3 in. by 11 in.	14 10 0	15 10 0	
" " 3 in. by 9 in.	13 10 0	14 10 0	
Battens	11 0 0	12 0 0	
Second white deals, 3 in. by 11 in.	13 10 0	14 10 0	
" " 3 in. by 9 in.	12 10 0	13 10 0	
" " battens	9 10 0	10 10 0	
Pitch-pine: deals	16 10 0	20 0 0	
Under 2 in. thick extra	0 10 0	1 0 0	
Yellow Pine—First, regular sizes	40 0 0	upwards.	
Oddments	28 0 0	"	
Seconds, regular sizes	30 0 0	"	
Yellow Pine oddments	25 0 0	"	
Kauri Pine—Planks, per ft. cube	0 3 6	0 5 0	
Danzig and Stettin Oak Logs—Large, per ft. cube	0 2 6	0 3 6	
Small " "	0 2 3	0 2 6	
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6	
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9	
¾ in. do. do.	0 0 7	—	

WOOD (*continued*).

JOINERS' WOOD (*continued*)—	At per standard. £ s. d.	£ s. d.	
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	0 1 0	
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 6	
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0	
Teak, per load	17 0 0	21 0 0	
American Whitewood Planks, per ft. cube	0 4 0	—	
Prepared Flooring—	Per square.		
1 in. by 7 in. yellow, planed and shot	0 13 6	0 17 6	
1 in. by 7 in. yellow, planed and matched	0 14 0	0 18 0	
1¼ in. by 7 in. yellow, planed and matched	0 16 0	1 0 0	
1 in. by 7 in. white, planed and shot	0 12 0	0 14 6	
1 in. by 7 in. white, planed and matched	0 12 6	0 15 0	
1¼ in. by 7 in. white, planed and matched	0 15 0	0 16 6	
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	0 13 6	
1 in. by 7 in. do. do.	0 14 0	0 18 0	
¾ in. by 7 in. white do. do.	0 10 0	0 11 6	
1 in. by 7 in. do. do. do.	0 11 6	0 13 6	

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.	
Rolled Steel Joists, ordinary sections	5 15 0	6 15 0	
Compound Girders, ordinary sections	7 12 6	8 15 0	
Angles, Tees and Channels, ordinary sections	7 7 6	8 7 6	
Flitch Plates	7 15 0	8 5 0	
Cast Iron Columns and Stanchions including ordinary patterns	6 12 6	7 15 0	

METALS.

IRON—	Per ton, in London. £ s. d.	£ s. d.	
Common Bars	6 15 0	7 5 0	
Staffordshire Crown Bars, good merchant quality	7 5 0	7 15 0	
Staffordshire "Marked Bars"	9 10 0	—	
Mild Steel Bars	8 5 0	8 15 0	
Hoop Iron, basis price	8 15 0	9 0 0	
" " Galvanized	16 10 0	—	
("And upwards, according to size and gauge.)			
Sheet Iron, Black—			
Ordinary sizes to 20 g.	9 0 0	—	
" " 24 g.	10 0 0	—	
" " 26 g.	11 15 0	—	
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g.	12 0 0	—	
Ordinary sizes to 22 g. and 24 g.	12 10 0	—	
" " 26 g.	13 10 0	—	
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	15 0 0	—	
" " 22 g. and 24 g.	15 10 0	—	
" " 26 g.	17 0 0	—	
Galvanised Corrugated Sheets—			
Ordinary sizes 6 ft. to 8 ft. 20 g.	12 0 0	—	
" " 22 g. and 24 g.	12 10 0	—	
" " 26 g.	13 5 0	—	
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11 0 0	—	
Best Soft Steel Sheets, 22 g. & 24 g.	12 0 0	—	
" " " 26 g.	13 5 0	—	
Cut nails, 3 in. to 6 in.	8 10 0	9 0 0	

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.	
LEAD—Sheet, English, 3 lb. and up	15 10 0	—	
Pipe in coils	16 0 0	—	
Soil pipe	18 10 0	—	
Compo pipe	18 10 0	—	
ZINC—Sheet—			
Vieille Montagne ton	30 10 0	—	
Silesian	30 5 0	—	
COPPER—			
Strong Sheet per lb.	0 0 10	—	
Thin " "	0 0 11	—	
Copper nails "	0 0 10	—	
BRASS—			
Strong Sheet "	0 0 9½	—	
Thin " "	0 0 10	—	
TIN—English Ingots "	0 1 4½	—	
SOLDER—Plumbers' "	0 0 6½	—	
Tinmen's "	0 0 8	—	
Blowpipe "	0 0 9	—	

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2¾d.	per ft. delivered.
" fourths	2d.	" "
21 oz. thirds	3¾d.	" "
" fourths	3d.	" "
26 oz. thirds	4¾d.	" "
" fourths	3¾d.	" "
32 oz. thirds	5¾d.	" "
" fourths	5d.	" "
Fluted Sheet, 15 oz.	3¾d.	" "
" 21 oz.	4¼d.	" "
⅛ Hartley's Rolled Plate	2d.	" "
⅛ " " "	2¼d.	" "
¼ " " "	2½d.	" "

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 5
" " " in barrels	"	0 1 6
" " " in drums	"	0 1 8
Boiled " " in pipes	"	0 1 7
" " " in barrels	"	0 1 8
" " " in drums	"	0 1 10
Turpentine, in barrels	per gall.	0 3 4
" in drums	"	0 3 6
Genuine Ground English White Lead	per ton	19 15 0
Red Lead, Dry	"	19 5 0
Best Linseed Oil Putty	per cwt.	0 6 6
Stockholm Tar	per barrel	1 12 0

PRICES CURRENT,—*Continued on page 619.*

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Required.	Premiums.	Designs to be Delivered
*Proposed Northumberland War Memorial	Committee	Not stated	No date.

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tenders, etc., supplied by	Tenders to be Delivered
Extension of Electric Light Installation, Workhouse	Pontefract Guardians	A. Hartley, J.P., County Chambers, Castleford	Dec. 10
Street Works, Openshaw	Manchester Paving, etc., Committee	Paving, etc., Department (Surveyor's Office), Town Hall, Manchester	Dec. 12
Street Works, Clayton	do.	do.	do.
Street Works, Bradford (N. Manchester)	do.	do.	do.
Street Works, Ardwick	do.	do.	do.
Street Works, Palmerston-street, Manchester	do.	do.	do.
Alterations, etc., Dunraven Hotel, Tonypandy.....	Trustees of the late T. Davies	A. O. Evans, Williams, & Evans, Architects, Pontypridd	do.
Granite, etc.....	Longton Corporation	J. W. Wardle, Borough Surveyor, Court House, Longton	do.
Painting, etc., Gowerton County School.....	Glamorgan County Council.....	T. M. Franklen, County Council Offices, Westgate-street, Cardiff..	do.
Footpath, Caerau Council School, Maesteg	do.	do.	do.
Playgrounds & B'nd'ry-Wall, Seven Sisters Ccl. Schl.	do.	do.	do.
Stores, Paints, Oils, etc.	Cardiff Corporation	J. Wassey, Town Hall, Cardiff	do.
Repairs, etc., of Crown-st. Infants' Council School..	Brighton Education Committee....	T. Simpson & Son, Surveyors, 17, Ship-street, Brighton	do.
Laying-out, etc., Goodmayes Recreation Ground ..	Ilford U.D.C.....	H. Shaw, Surveyor, Town Hall, Ilford	do.
99 yds. of 15-in. Cast-Iron Flanged Pipes, Alnmouth	Alnwick R.D.C.....	H. W. Walton, Clerk, Alnwick	do.
Wing for Female Patients at Melrose Asylum	Roxburgh District Board of Lunacy	S. Mitchell & Wilson, Architects, 13, Young-street, Edinburgh ..	do.
Stores	Birkenhead Tramways Committee..	W. Wyld, Laird-street Offices, Birkenhead	Dec. 13
Cottage at Crumlin Station, Mon.	Great Western Railway Co.	Engineer, Newport Station.....	do.
Cleaning, Colouring, etc., of Schools.....	Leyds Education Committee	W. Parker, Secretary, Education Offices, Leeds.....	do.
21 Scullieries and Water-Closets, Greenup's-terrace..	.....	S. Wilkinson, Architect, Sowerby Bridge	do.
Fittg-up Baths in 8 Hses., Nichol's-ter., Sowerby B.	.....	do.	do.
Heating Infirmary Wards at Workhouse	Dudley Guardians	G. W. Caster, Clerk, Union Offices, St. James'-road, Dudley	do.
Hot-Water Supply to Baths and Lavatories at Workh.	do.	do.	do.
Painting, etc., at Town Hall, Calverley-road	Tunbridge Wells Corporation.....	W. H. Maxwell, Borough Engineer, Town Hall, Tunbridge Wells	do.
Stoneware Pipes, Lime, and Cement	Banbury Town Council	N. H. Dawson, Borough Surveyor, Town Hall, Banbury	do.
Tree-guard Laths	East Ham Corporation	Borough Engineer, Town Hall, East Ham, E.....	do.
Granite Kerb	Edmonton U.D.C.	G. Eedes Eachus, Engineer, Town Hall, Lower Edmonton	do.
Sewage Works, Easky, Ireland	Dromore West R.D.C.....	Board Room, Dromore West	do.
Sewerage Works, Northwood	Watford R.D.C.	E. Lailey, Engineer, 9, Market-street, Watford	do.
Alterations to Market and Shop	Wrexham Town Council	Borough Surveyor, Willow-road, Wrexham.....	do.
Spiral and Volute Springs.....	East India Railway Co.	C. W. Young, Secretary, Nicholas-lane, London, E.C.	Dec. 14
Unclimbable Wrought-Iron Fencing, Middleton-road	Manchester Improvement Com....	City Surveyor's Office, Town Hall, Manchester	do.
Road-making at Hemsworth	Hemsworth R.D.C.	T. H. Richardson, Hemsworth, near Wakefield	do.
Road-making at Kinsley	do.	do.	do.
Unbroken Granite	Fulham Guardians	E. J. Mott, Clerk, Fulham Palace-road, Hammersmith, W.	do.
Alterations, etc., to Store Buildings, Garrison-lane..	Felixstowe and Walton U.D.C.	H. Clegg, Engineer, Town Hall, Felixstowe.....	do.
Two Firemen's Dwellings, Bedminster Police Station	Bristol Watch Committee	T. H. Yabbicom, City Engineer, 63, Queen-square, Bristol	do.
Waterworks, Brookdown-terrace, Pill, St. Stephen's	St. Germans R.D.C.	F. E. Cleverton, 4, Buckland-terrace, Plymouth.....	do.
School, Play-sheds, etc., Strathdon, Scotland	School Board.....	G. B. Mitchell, Architect, 148, Union-street, Aberdeen.....	do.
Five Houses in Clarence-street, Ulverston.....	Swarthmoor, etc., Co-op. Soc., Ltd.	Settle & Brundrit, Architects, Ulverston.....	do.
Repairs, etc., St. Paul's Church, North Sunderland	.....	G. Reavell, jun., Architect, Alnwick.....	do.
Saleshops, Offices, Assem. Hall, Trippet-la., Sheffield	Ancient Order of Foresters.....	Hall & Fenton, Architects, 14, St. James's-row, Sheffield.....	Dec. 15
Five Sets of Fire Escape Stairs, Downpatrick Asylum	Down District Asylum Committee..	S. Rea, Clerk, Downpatrick.....	do.
Brushes, etc.	Leicester Corporation	E. G. Mawbey, Boro' Engineer, Town Hall, Leicester	do.
Materials (Seven Contracts)	do.	do.	do.
Granite.....	do.	do.	do.
Making-up Delahays-road, Hale	Hale U.D.C.	T. Blagburn, Surveyor, Ashley-road, Hale, Cheshire	do.
Painting	Barnstaple U.D.C.	Offices of Borough Surveyor	do.
Fire-station, Woodwell	Batley Corporation	J. C. Barrowclough, Waterworks Engineer, Batley	do.
Hospital, Fraserburgh	Town Council.....	W. Reid, Architect, Saltoun-square, Fraserburgh, Scotland.....	do.
Eleva. & Gds. Lift, Cen. Police Office, St. Andrew's-sq.	Glasgow Corporation	Public Works Office, 64, Cochrane-street, Glasgow	do
Tall Lodges, Towers, etc., on Marine Drive.....	Scarborough Town Council.....	E. T. Beard, Engineer, 57, Sandside, Scarborough	Dec. 16
2,000 tons Steel Girder Rails	Glasgow Corporation	J. Dalrymple, 102, Renfield-street, Glasgow	do.
Stores	Graigola-Merthyr Co., Ltd.....	Offices of the Company, Swansea	Dec. 17
Six Miles of Sewers (Contract No. 10)	Liversedge U.D.C.....	C. Gott & Sons, Engineers, 8, Charles-street, Bradford.....	do.
School at Mountain Ash	Rev. H. Irvine	F. R. Bates, Architect, 26, Westgate-chambers, Newport, Mon...	do.
Stores	Madras Railway Co.....	W. H. Cole, Secretary, 61, New Broad-street, London, E.C.	Dec. 19
Stone Hauling	Bristol Sanitary, etc., Committee ..	T. H. Yabbicom, 63, Queen-square, Bristol.....	do.
Plant for Extension of Power Station	Cardiff Corporation	A. Ellis, Borough Electrical Engineer, The Haves, Cardiff	do.
1,100 yds. of Sewers, etc.....	Settle R.D.C.....	Barber, Hopkinson, & Co., Engrs., Craven Bank-chbrs., Keighley.	do.
Disinfecting Liquid	Chorley Corporation.....	J. Mills, Town Clerk, Town Hall, Chorley	do.
Road Works, Haycroft-lane.....	Stevenage U.D.C.	Offices of Council, Orchard-road, Stevenage.....	do.
Telephone Fire-Alarm System	Ilford U.D.C.....	H. Shaw, Surveyor, Town Hall, Ilford	do.
Infectious Diseases Hospital	Peterhead Town Council.....	T. H. Scott, Architect, Town House, Peterhead, Scotland	do.
*Two Cottages for Firemen in Westbourne-road	Beckenham U.D.C.	John Angell, Surveyor to the Council, Beckenham	do.
*Bath & Mess Rm. at Dust Destructor Wks., Arthur-rd.	do.	do.	do.
845 yds. Wrought-Iron Fencing, with Gates, etc. ..	Hindley U.D.C.....	A. Holden, Engineer and Surveyor, Council Offices, Hindley	do.
Infants' School, St. Paul's School, Compstall	.....	H. Beswick, County Architect, Newgate-street, Chester	Dec. 20
3,000 Volt Steam Alternator of 100 k.w. Capacity....	Fulham Borough Council	A. J. Fuller, Borough Electrical Engineer, Town Hall, Fulham ..	do.
Stores	Bombay, etc., Railway Co.....	T. W. Wood, Sec., Gloucester House, Bishopsgate-st. Without, E.C.	do.
Refuse Destructors, Furnaces, etc.....	Dublin Cleansing Committee	S. Harty, City Engineer, City Hall, Dublin	do.
Road Works, Blanford and Crakell Roads.....	Reigate Town Council.....	F. T. Clayton, Borough Surveyor, Municipal-buildings, Reigate ..	do.
Public Conveniences and Cloak-rooms, Lower-parade	Blackpool Corporation.....	J. S. Brodie, Borough Engineer, Town Hall, Blackpool	do.
Making-up London-road	Wembley U.D.C.	C. R. W. Chapman, Surveyor, Public Offices, Wembley	do.
Two Blocks of Dwellings at Prince Rock	Plymouth Corporation.....	Hine & Odgers, Lockyer-street, Plymouth	do.
*Roadmaking and Paving Works	Willesden District Council	Council's Engineer, Dyne-road, Kilburn, N.W.	do.
150 ft. Deck Spans for Tonse Bridge	East India Railway Co.	C. W. Young, Secretary, Nicholas-lane, London, E.C.	Dec. 21
Britannia and Newline Sewer	Bacup Corporation	W. H. Elce, Borough Engineer, Bacup.....	do.
*Road and Sewer Works	Barnet R.D.C.	Council's Surveyor, 14A, Mount-view, High Barnet	do.
Plant for Generating Station	Southend-on-Sea Corporation	W. E. J. Heenan, Borough Electrical Engineer, Southend-on-Sea	do.
*Road-making, etc., Hugon-road (Section 2)	Borough of Fulham	Borough Surveyor, Town Hall, Fulham, S.W.....	do.
Switchboards, Mains, etc., at New Docks, Salford ..	Manchester Ship Canal Co.....	W. H. Hunter, Engineer to Company, 41, Spring-gdns, Manchester.	Dec. 22
Mains, etc., and Arc Lamps, etc.....	do.	do.	do.
Heating Board Room at Workhouse	Wimborne and Cranborne Guardians	W. J. Fletcher, Architect, Wimborne	do.
Isolation Hospital at Cefn Hirgoed, Bridgend	Bridgend Hospital Committee	P. J. Thomas, Architect, Bridgend	Dec. 23
Abutments, etc., for Bridge and Subway, etc.....	Hull Corporation	A. E. White, City Engineer, Town Hall, Hull.....	do.
Girders, etc.....	do.	do.	do.
350 tons of Tar Paving Materials for Footpaths....	Newmarket U.D.C.	S. J. Ennion, Clerk, Deva Chambers, Newmarket	do.
*New Coastguard Buildings at Langley	Admiralty	Works Dept., Admiralty, 21, Northumberland-avenue, W.C.	do.
Town Hall, Ossett	Ossett Corporation	W. Hanstock & Son, Architects, Branch-road, Batley	Dec. 24
Two Travelling Sewage Distributors	Hanley Corporation	Willcox & Raikes, Engineers, 63, Temple-row, Birmingham	Dec. 30
Materials	West Sussex Rds. and Bridges Com.	W. McIntosh, County Surveyor, Worthing-road, Horsham	Dec. 31
Cartage.....	do.	do.	do.
Heating New Public Library, Drogheda	.....	F. H. Tallan, 35B, Kildare-street, Dublin.....	do.
Fever Hospital at Newcastleton	Liddesdale District Committee	A. Inglis, Architect, 12, Bridge-street, Hawick	do.
*Additions Press House, etc., at Markfield-road, N...	Tottenham, etc., Jt. Drainage Com.	P. E. Murphy, Engineer, 712, High-road, Tottenham	Jan. 3-05

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be Delivered
New Board-room and General Offices	River Wear Commissioners	Henderson & Hall, Architects, 28, John-street, Sunderland	Jan. 4-05
*Isolation Hospital, etc., Lewes-road, Newhaven	Newhaven U.D.C.	F. J. Rayner, Architect, 34, Meeching-road, Newhaven	do.
Repairs, Llechyfedach Council School	Carmarthenshire Education Com...	W. D. Jenkins, County Edu. Architect, Shire Hall, Carmarthen..	Jan. 5
Repairs, Llangathen Council School	do.	.....	do.
Sinking Well in Playground, Llanwmn (Cwmbach) C.S.	do.	.....	do.
Repairs to Master's House, Llanwmn (Cwmbach) C.S.	do.	.....	do.
Ventilation and Repairs, Trelech Council School....	do.	.....	do.
Repairs, Ffynonwen Council School	do.	.....	do.
Venti. Repairs, New Cloak Rooms, etc., Bryndu C.S.	do.	.....	do.
Colouring and Painting, Llangennech Council School	do.	.....	do.
Repairs, Glasfryn Council School	do.	.....	do.
Repairs, Coedmore Council School	do.	.....	do.
Venti. & Alters. to Heating Appar. Ffairfach C. Schl.	do.	.....	do.
*Alterations and Additions to Gamuel-road Schools..	Walthamstow Education Committee	H. Prosser, Architect, Edu. Com. Offices, High-st., Walthamstow	Jan. 9
Making-up Roads	Southall-Norwood U.D.C.	R. Brown, Engineer, Public Offices, Southall	Jan. 10
Pulling Down Houses, Shirland-lane, Sheffield	.....	J. W. Naylor, York-street, Sheffield	No date
No. 6 Sewage Distributors, 80 ft. in diameter	Hanwell District Council	S. W. Barnes, Surveyor, Council Offices, Hanwell	do.
Alterations to Brithdir Constitutional Club	.....	7, East-view, Brithdir	do.
Lancashire Steam Boiler, Chelsea Infirmary	The Guardians	J. Dowling, Clerk, 250, King's-road, Chelsea	do.
100 Houses, Oldbury District	.....	G. Payton, Architect, 58, New-street, Birmingham	do.
Steel Girder Rails	Leeds Tramways Committee	J. B. Hamilton, Standard Buildings, City-square, Leeds	do.
Residence, Cottage, Stables, etc., Wothorpe, Stamford	.....	J. G. Stallebrass & Sons, Architects, North-street, Peterborough	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*Clerk of Works	Frinton-on-Sea U.D.C.	3*l.* per week	Dec. 22
*Instructors in Manual Training (Woodwork)	London C.C.	100*l.*	Jan. 4-05
*Assistant Instructors in Manual Training (Woodwork)	do.	80*l.*	do.

Those marked with an asterisk (*) are advertised in this number. *Competitions*, iv. *Contracts*, iv. vi. viii. x. *Public Appointments*, xix.

PRICES CURRENT.—*Continued from page* 617.

VARNISHES, &c.	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BRIDGWATER.—For new cloak room and alterations to infants' department of the Eastover Council Schools, for the Education Committee. Mr. Francis Parr, Borough Surveyor, Bridgwater. Quantities by Borough Surveyor:—

T. H. Tapscott	£325	I. E. Fursland	£285
S. Palmer	309	A. Geen*	271
C. Bryer, junr.	298		

[All of Bridgwater.]

BRISLINGTON.—For roads, paths, iron fencing, etc., at proposed cemetery, for the Parish Council. Mr. H. M. Bennett, surveyor, 36, Corn-street, Bristol:—

A. E. Denby & Co.	£1,273 0 0	J. Coles & Son	£885 16 7
E. Walters & Son	1,060 0 0	W. Binden	855 0 0
Thatcher Bros.	990 14 2	I. Hatherly, Penarth Lodge, Brislington*	847 0 0
W. Hickery	958 0 0		

BRENTFORD.—For 750 yds. of blue Guernsey granite, for the Urban District Council. Mr. Nowell Parr, Surveyor, Clifden House, Boston-road, Brentford:—

	Per cube yard. s. d.		Per cube yard. s. d.
E. & H. Beevers	16 0	L. Somerfield	14 5
Fry Bros.	15 6	J. Mowlem & Co.	14 2
A. & F. Manuelle	15 2	G. Le Maitre, Westminster*	14 1
W. Griffiths & Co., Ltd.	15 0		

BRYNMAWR.—For erecting a public library, for the Free Library Committee of the District Council. Mr. F. R. Bates, architect, Westgate-chambers, Newport:—

T. S. Foster	£1,620 0 0	A. T. Riddiford	£1,371 6 10
N. Bagley	1,486 8 9	J. Jenkins, Brynmawr*	1,370 0 0
J. Morgan	1,467 0 0		
H. Smith	1,447 0 0		
J. J. Partridge	1,445 0 0		

CATERHAM (Surrey).—For constructing a building estate road, for Mr. Chas. Asprey. Messrs. Thomas Dinwiddy & Sons, architects and surveyors, Westminster and Greenwich:—

	Completed road.	Section of road.
Raynor Hill	£1,392	£451
Quittenton, Warlingham*	1,419	404

CHELL.—For workhouse additions. Messrs. W. F. Slater & W. H. Walley, joint architects:—

W. Cooke	£11,940	J. James	£11,473
J. Cooke	11,900	T. Godwin	11,425
W. Grant & Sons	11,750	J. Bagnall	11,130
York & Godwin	11,580	Bennett Bros.	11,050
J. Broadhurst & Son	11,483	J. Gallimore, Newcastle*	10,994

FAKENHAM.—For alterations to premises in the Market-place, Fakenham. Mr. W. J. Dunham, architect, Opie-street, Norwich:—

J. W. Fisher	£625 0	J. Needs*	£585 15
C. Tuthill	589 0		

[All of Fakenham.]

HAYWARD'S HEATH.—For sewerage and sewage disposal works for the Urban District Council. Mr. Baldwin Latham, engineer, Parliament-mansions, Victoria-street, Westminster:—

Norman & Burt	£42,175 0 0	B. Firth & Co.	£23,342 12 4
F. W. Irvin	35,767 0 0	J. & T. Binns	22,746 15 4
W. Griffith	29,253 12 3	I. Iles, jun.	22,665 11 5
Pethick Bros.	28,500 0 0	A. J. Cottle	22,391 5 0
W. Manvers	26,777 0 0	Muirhead & Co.	21,925 0 0
H. Hill	26,463 0 0	Dean & Co.	21,908 10 6
J. Riley	25,314 5 6	Peerless, Dennis, & Co.	21,878 0 0
Hawben & Best	24.703 10 0	Wallis & Co.	21,000 0 0
Underwood Bros.	24,227 0 0	J. Jackson	20,576 6 6
Public Works Construction Co.	23,537 3 2	J. W. Harrison	19,947 0 0
G. Bell	23,480 0 0	Johnson & Langley, Leicester*	18,871 19 11

GRIMSBY.—For public conveniences at the People's Park, Grimsby. Mr. H. Gilbert Whyatt, Borough Engineer, Town Hall, Grimsby:—

Building.

B. Robinson	£539 8 8	T. R. Waterman	£412 10 0
J. Butler	529 0 0	F. Swallow	490 0 0
R. G. Kitching	499 3 5	Gilbert & Kirton	397 7 0
Hewins & Goodhand	460 0 0	G. Cook, Grimsby*	368 10 0
G. & J. Smith	457 5 0		

Drainage.

Gilbert & Kirton	£154 11 4	Hewins & Goodhand, Grimsby*	145 14 0
T. R. Waterman	169 10 0		

Supplying and Fixing W.C. Basins.

	Delivered.	Fixed.
T. B. Redshaw	£86 15 0	£96 15 0
Twyfords, Ltd.	71 15 6	90 5 6
J. Duke, Ltd.	—	87 5 0
J. Butler	80 0 0	85 0 0
Winkle & Co.	62 0 0	76 0 0
D. J. Dolby	60 0 0	68 17 0
King & Co.	55 16 0	66 1 0
Robinson & Emerson	55 14 0	65 10 6
J. Duckett & Son	57 6 0	64 12 6
Adamsez	42 2 6	54 2 6
W. G. Padgett	41 0 0	50 0 0
Oates & Green	60 0 0	—
W. E. Farrer	53 5 0	—
Doulton & Co., London*	43 0 0	—
G. & D. Musgrave	42 14 0	—

KILWINNING (N.B.).—For erecting new smallpox hospital, for the Joint Committee of the Northern District Committee of Ayrshire Combination. Messrs. J. & J. Armour, architects, Irvine:—

Mason and Brickwork: Gregory & Co., Glasgow* (with brick boundary wall)	£1,524 2 6
Carpenter and Joiner Works: W. Connor, Irvine* (without wood fencing)	777 16 4
Plumber Work: H. Twaddle & Son, Glasgow*	409 0 0
Plaster Work: J. Ramage, Saltcoats*	291 8 2
Slater Work: J. Johnston, Irvine*	199 0 0
Roughcast Work: T. Hall & Sons, Irvine*	76 0 10
	£3,277 7 10

LEATHERHEAD.—For road works, Lindon-road, for the Urban District Council. Mr. T. Salkield, Surveyor, Council Offices, Leatherhead:—

J. Mowlem & Co., Ltd.	£519 0 0	L. Somerfield	£388 2 0
W. Norris	449 0 0	A. C. Soan	374 10 0
F. Thacker	410 3 9	James May	370 13 6
F. Hoffmann	405 2 0	T. Free & Sons, Maidenhead*	367 5 6
Cunningham, Forbes, & Co.	389 18 0		

LITTLE THURROCK (Essex).—For making-up Whitehall-road and College-road, for the Orsett Rural District Council. Mr. F. Lowry, engineer, Hornchurch. Quantities by engineer:—

A. Deakin	£1,046 5 3	R. J. Mead	£873 8 0
J. Jackson	999 19 9½	W. J. Wisby	832 10 7
W. White	909 8 7	J. Elling-ford, Orsett*	799 10 9
T. W. Marsh	884 12 10		

LONDON.—For heating apparatus for junior mixed school, Mantle-road, Deptford, for the London County Council :—

J. Esson & Co.	£560 0 0	Brightside Foundry & Engineering Co., Ltd.....	£304 17 6
R. Clarke	400 0 0		
Wontner-Smith, Gray & Co...	332 0 0		
C. Kite & Co...	321 10 0	J. Richmond & Co., Ltd., 30, Kirby-street, Hatton-garden*	298 0 0
G. & E. Bradley	311 10 0		
Bates & Sons..	305 0 0		

LONDON.—For the docking and repair of the s.s. *Barrow*, for the London County Council :—

Mills & Knight ..	£735 0	London Graving Dock Co.....	£467 10
Fletcher, Son, & Fearnall	546 0	J. Stewart & Son, Isle of Dogs* ..	467 0

LONDON.—For external restoration to St. Alfege Church, Greenwich. Messrs. Thomas Dinwiddy & Sons, architects, Westminster and Greenwich :—

H. S. Holloway	£910	T. Crossley & Son ..	£810
T. D. Leng	842	Killby & Gayford* ..	628

RUGBY.—For Baptist church and school. St. Andrew's-street, Rugby. Messrs. George Baines & R. Palmer Baines, architects, 5, Clement's-inn, Strand, London, W.C. :—

—	Est. A.	Est. B.	Est. C.	Total.
	£ s. d.	£ s.	£ s. d.	£ s. d.
Coulson & Lofts	5,783 12 0	604 13	186 10 0	6,774 15 0
F. Gough & Co.	5,814 0 0	634 0	184 0 0	6,632 0 0
Walton & Son..	5,564 0 0	582 0	280 0 0	6,426 0 0
J. Hollowell....	5,520 0 0	620 0	272 0 0	6,412 0 0
J. Thorwood ..	5,640 0 0	534 0	162 0 0	6,336 0 0
Foster & Dicksee	5,513 0 0	605 0	176 0 0	6,294 0 0
J. Parnell & Son	5,342 4 0	570 14	255 16 0	6,168 14 0
Kerridge & Shaw	5,410 0 0	540 0	163 0 0	6,113 0 0
A. R. Cleaver ..	5,095 0 0	647 0	177 0 0	5,919 0 0
Linnell & Son, Rugby*	5,106 8 9	593 0	181 19 6	5,881 8 3

Estimate A.—For the church, with lower part of tower only, and schools with vestries, etc., complete.
Estimate B.—For upper part of tower, with end gallery and staircase.
Estimate C.—For boundary fence walls, gates, railings, etc.

SANDOWN.—For erecting public library. Mr. James Newman, architect :—

J. Meader	£1,988 0	Mussellwhite & Sapp.....	£1,909 0
W. & H. Simmonds	1,985 0	Brown & Corney	1,875 10
T. & E. W. Jenkins	1,932 10	E. James*	1,740 17

SANDOWN.—For house and shop, High-street, for Mr. F. H. Masters. Mr. James Newman, architect :—

G. New	£1,590 0	Brown & Corney*	£1,380 10
W. & H. Simmonds	1,420 0		

SANDOWN.—For villa residence, for Mr. John Mew. Mr. James Newman, architect :—

Brown & Corney....	£746	J. Payne*.....	£615
L. A. Moorman, jun.	685		

SANDOWN.—For terrace of three small houses, Station-avenue. Mr. James Newman, architect :—

L. A. Moorman, jun.	£1,045	J. Payne	£930
Brown & Corney ..	997	G. New*	765
H. Attrill	945		

SANDOWN.—For alterations and additions to house and shop, Melville-street. Mr. James Newman, architect :—

Brown & Corney	£249 0	G. New*	£200 10

STOCKTON-ON-TEES.—For private street improvement works, for the Corporation. Mr. M. H. Sykes, Borough Engineer, Town Hall, Stockton :—

M. O'Dohertv, Stockton £126 9 8

SWINTON.—For making-up Frederick-street and Cowood-street, for the Urban District Council. Mr. R. Fowler, Surveyor, Council Offices, Swinton, near Rotherham :—

Shaw, Cliff, & Smart	£1,081	G. Brookes	£820
J. Rothery	1,003	Green Bros., Rotherham*	813
Addis Bros.	1,001		

[Surveyor's estimate, £854.]

WARE.—For paving footways, Kibes-lane, for the Urban District Council. Mr. J. Elliott Smales, Surveyor, New-road, Ware :—

Victoria Stone Co., Ltd., Hamilton House, Bishopsgate-street Without, E.C..... £122 12s.

YARDLEY.—For Cole Hall sewage disposal works (Contract No. 2), for the Rural District Council. Mr. A. W. Smith, Engineer, Council House, Sparkhill, near Birmingham :—

Sutherland & Thorpe, 31, Bearwood-road, Smethwick* £1,223 19 9

YARDLEY.—For the sewerage of Acock's Green, South-East, for the Rural District Council. Mr. A. W. Smith, Engineer, Council House, Sparkhill, near Birmingham :—

Langley, Hardy, & Johnson, Leicester* . £1,844 10

YORK.—For water supply to the City Asylum, for the Visiting Committee of the Corporation. Mr. A. Creer, City Engineer, Guildhall, York :—

Ashwell & Nesbit, Great Central-street* £1,717 10

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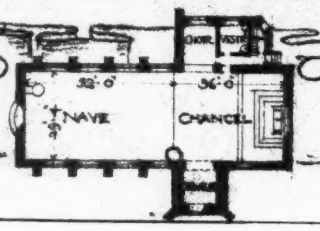

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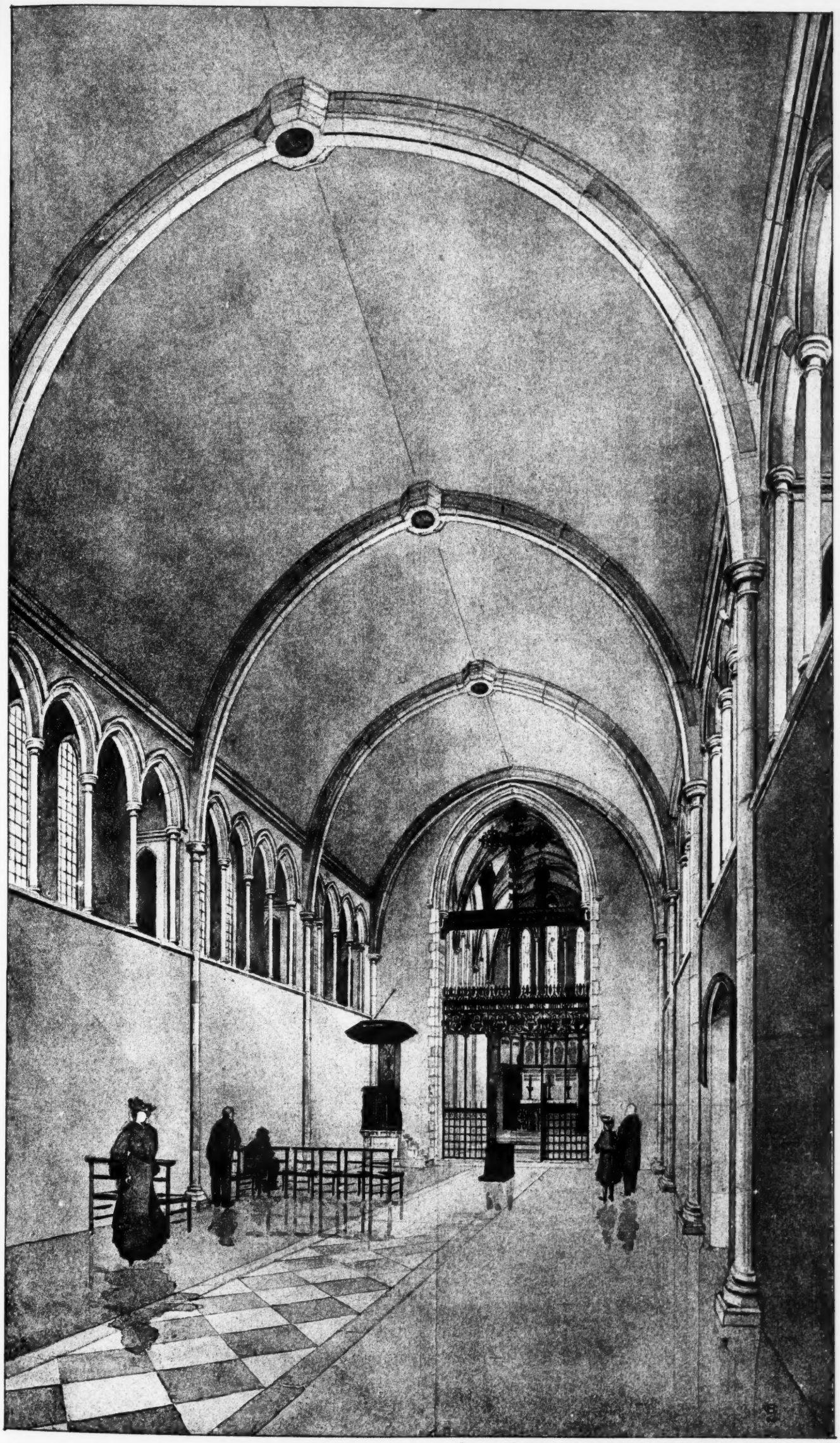

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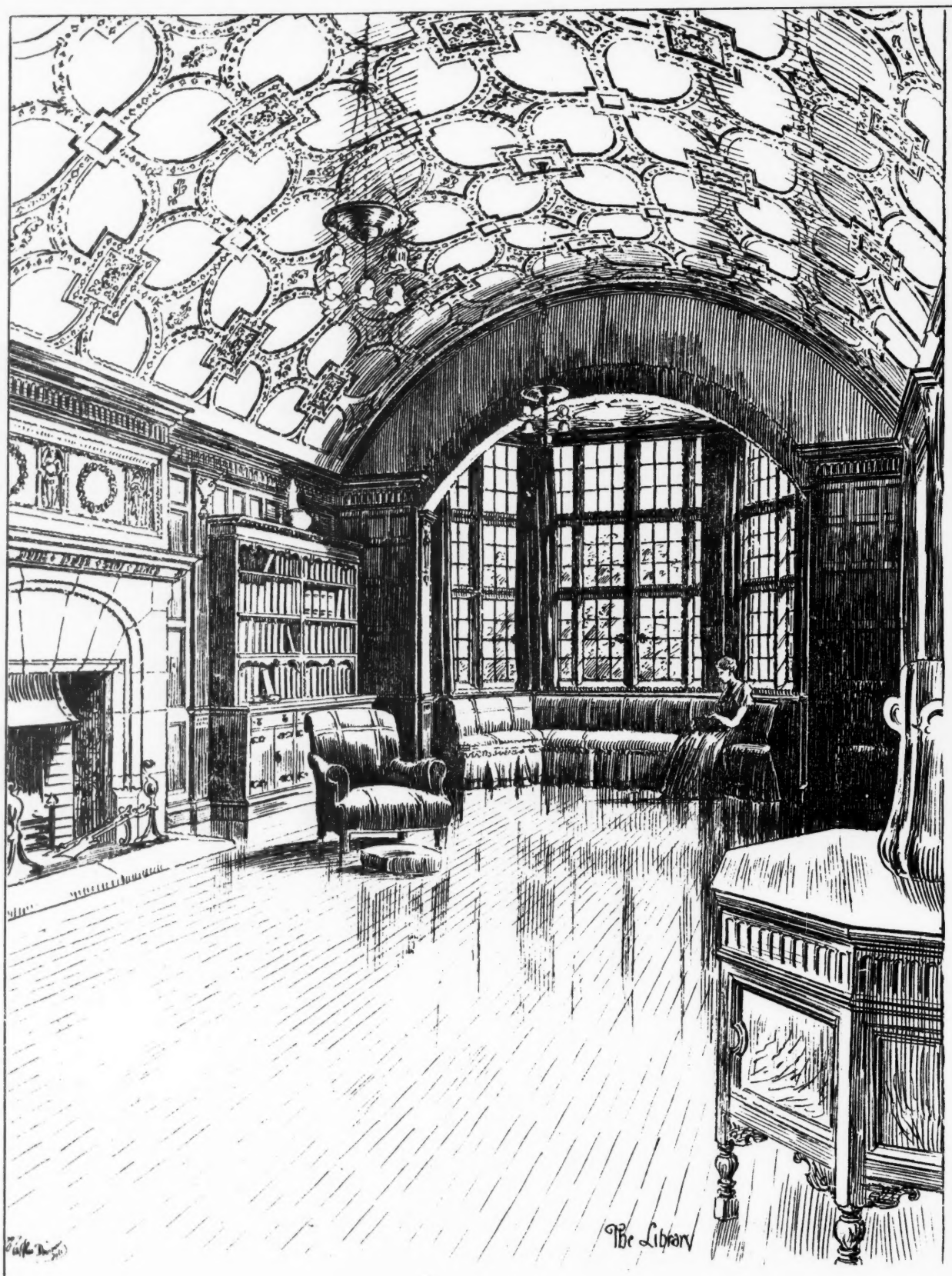

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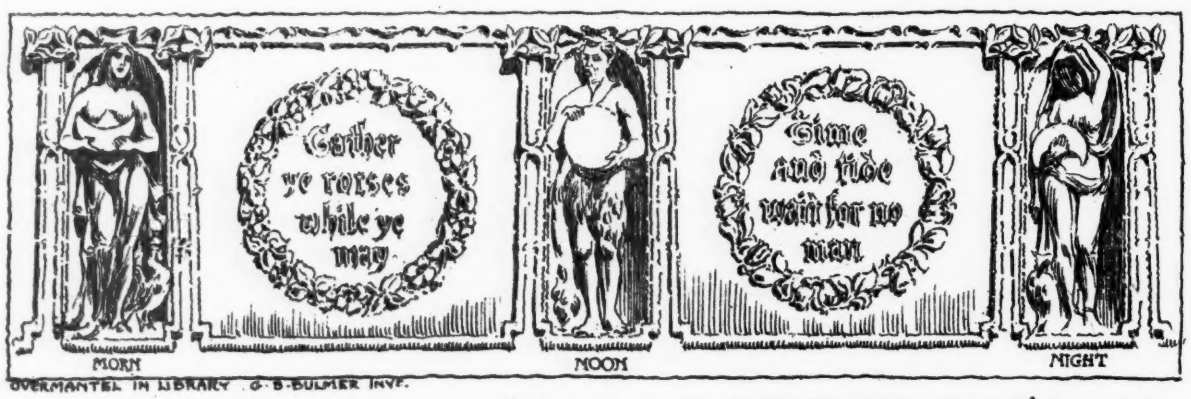

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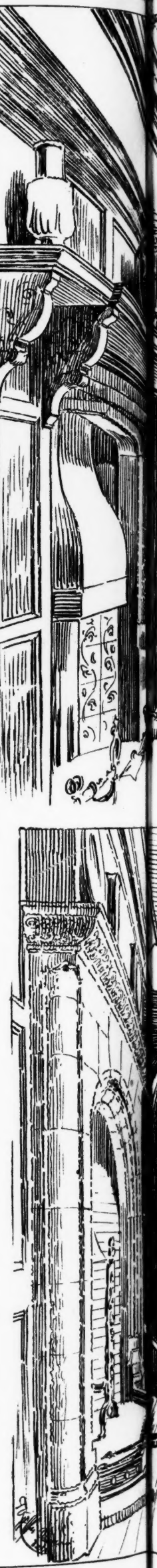

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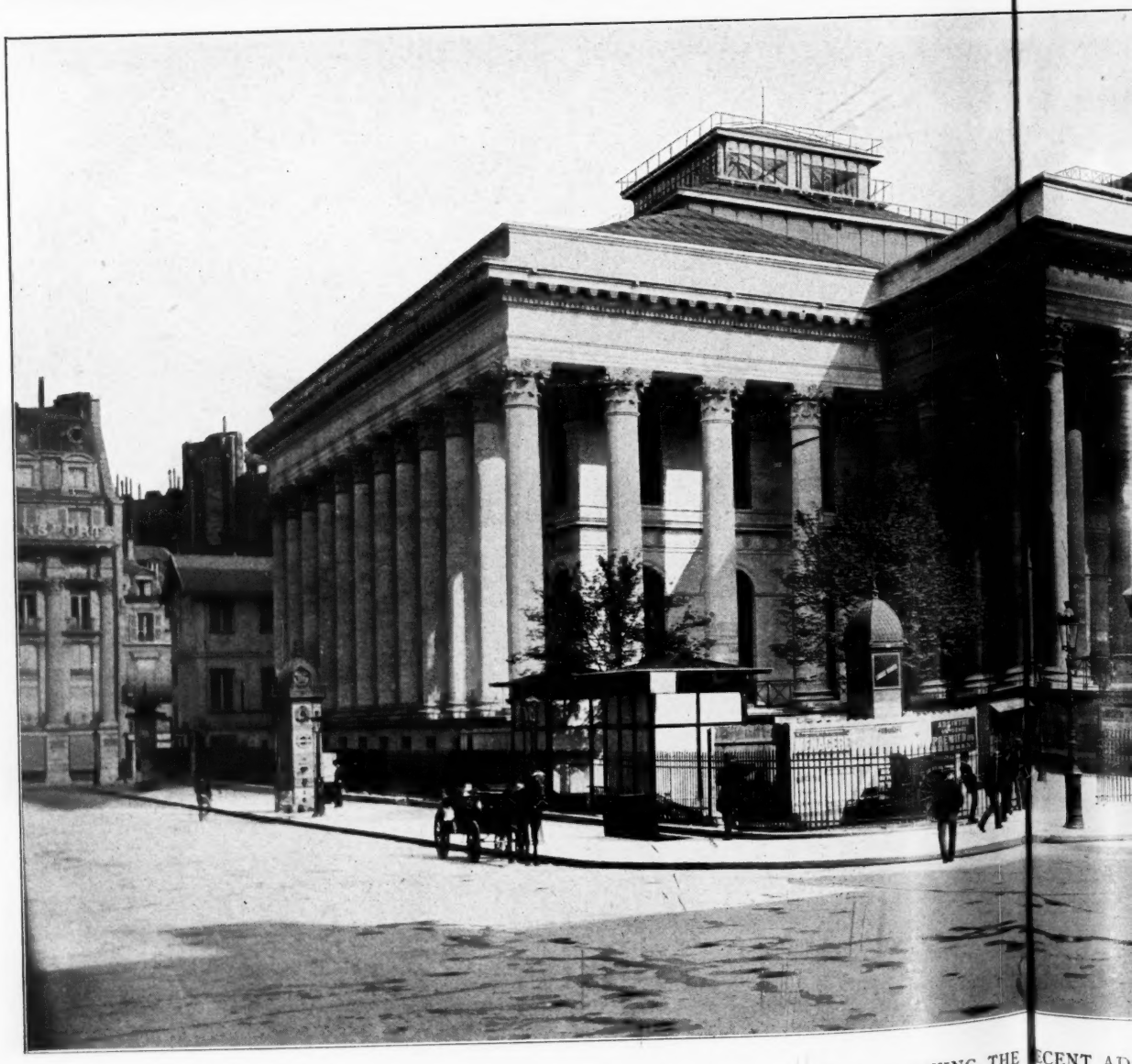

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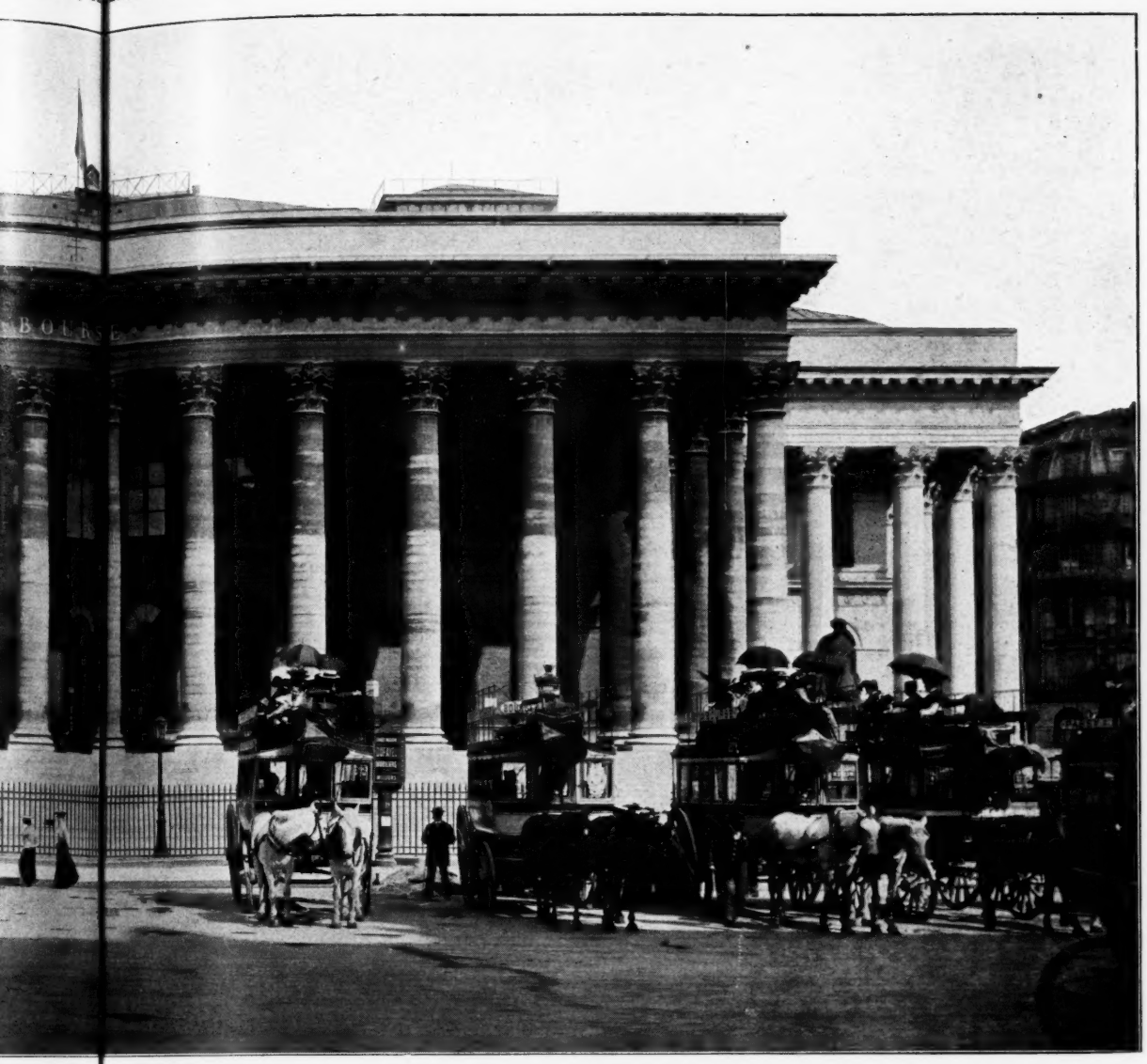

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